STEM Safety Rules

Nativity School STEM consists of a variety of engaging topics that students investigate in a lab setting. However, any science or STEM activity may have potential safety issues if not conducted properly. Safety in the classroom is an important part of the scientific and engineering processes. To ensure a safe learning environment, the list of rules below has been discussed with all students. We expect that students follow all these rules at all times.

1. Conduct yourself in a responsible manner at all times in the science room. Fooling around, practical jokes, teasing, and pranks will not be tolerated.

2. Follow all written and verbal instructions carefully. Ask your teacher questions if you are not sure what to do.

3. Do not touch any equipment, supplies, specimens, or other materials in the science room without permission from the teacher.

4. Perform only teacher approved experiments and activities. There will be times when you will be asked to design your own experiment, but teacher approval is required before you begin collecting data. You are not allowed to change the method after it is approved without getting additional teacher approval. Do not conduct any experiments when the teacher is out of the room.

5. Never eat, drink, chew gum, or taste anything in the science room.

6. Be careful when using the science equipment so that the equipment or your hands are not touching your face, eyes, and mouth. Wash your hands with soap and water after conducting science experiments and activities (hand sanitizer is not an acceptable substitute).

7. Wear safety goggles when instructed. Never remove safety goggles during the middle of an experiment or before all other materials are cleaned up. Putting away the goggles should be the last thing you do at the END of a lab.

8. Keep your work area and the science room neat and clean. You will be responsible for cleaning up all laboratory materials before you leave the room at the end of the class period.

9. Return all equipment, clean and ready for the next class, to where you got it from.

10. Dispose of all waste materials by following the teacher's instructions. Different types of waste material have to be disposed of in different ways.

11. Report any accident (fire, spill, breakage, etc.), injury (cut, burn, etc.) or hazardous condition (broken equipment, students not following directions, fooling around, etc.) to the teacher IMMEDIATELY.

12. Consider all chemicals in the science room to be dangerous. Do not touch, eat, drink, smell, or play with any chemicals unless specifically instructed to do so.

13. Handle all animals, living or once-living, with care and respect.

14. Always carry a microscope with both hands. Hold the arm with one hand and place the other hand under the base.

15. Treat all required supplies, specimens, and tools with care and respect.

16. Never open storage cabinets or enter the storage room without permission from the teacher.

17. Do not remove chemicals, equipment, supplies, or animals from the science room without permission from the teacher.

18. Handle all glassware with care. Never pick up hot or broken glassware with your bare hands.

19. Dress properly – long hair must be tied back. When not in uniform there can be no dangling jewelry, no loose or baggy clothing, and no sandals. Wear lab aprons when instructed.

20. Learn where the safety equipment is located, when it should be used, and who is allowed to use the equipment. Know where the exits are located and what to do in case of an emergency or fire drill.

The Correct Way To Use A Safety Shower In An Emergency

How to Use a Safety Shower

In the event of an emergency involving corrosive substances, it is crucial to know how safety showers are operated. The moment a corrosive chemical comes into contact with skin, it begins to cause tissue damage - and the damage becomes more serious with each passing second. That's why it's so important to make sure your staff know exactly when and how to use safety showers before the unthinkable happens.

When to use a safety shower

Safety showers are designed to mitigate the damage caused by exposure to corrosive, injurious substances. Corrosive chemicals include the following:

Common Injurious Corrosive Materials	Workplaces Frequently Exposed to Corrosive Substances:
Hazardous electric storage battery electrolyte(s)	Construction sites and commercial and manufacturing facilities where batteries are serviced and handled for forklifts and other machinery
Formaldehyde	Industries that manufacture, distribute, or sell hair straightener, paper towels, photographic film, shampoo, deodorant, toothpaste, lipstick and nail polish, some glues, composite panel products, automobiles, various forms of inks, wrinkle-free fabrics, building materials, and more
Sulfuric Acid (also known as battery acid)	Landscaping, automotive, farming, industrial cleaner manufacturing, and warehousing
Sodium Hydroxide (also known as lye or caustic soda)	Textiles, bleach/soap/detergent manufacturing, aluminum production, drain cleaner manufacturers
Anhydrous Ammonia	Refrigeration, laboratories, pharmaceuticals, and petroleum
Hydrochloric Acid	Chemical laboratories
Pesticides, herbicides, insecticides, etc.	Farming, landscaping, nurseries and greenhouses, agriculture
Chlorine (bleach)	Manufacturers of bleach, janitorial services, hospitals, pool and spa companies

While this list is not exhaustive, it should give you a good idea of the sorts of chemicals involved. If you think you work with a corrosive chemical but don't have access to safety showers, speak to your health and safety officer.

Once a corrosive chemical comes into contact with skin - no matter how small an amount - it is extremely important to use a safety shower as soon as possible. In accordance with the ANSI Z358.1 regulations, safety showers must be installed no more than a 10-second walk away from the hazardous area. See our guide to the ANSI regulations for more information.

Operating a safety shower can be very disruptive, and many people worry that using a safety shower will draw undue attention to themselves, or be seen as 'making a fuss' - but it really is better to be safe than sorry. Upon exposure to corrosive chemicals, tissue damage can occur surprisingly quickly, and once the damage is done, it's irreversible. Even small amounts of these chemicals can cause permanent scarring and life changing injury, so it's always better to err on the side of caution.

Before using a safety shower

Once exposure has occurred, don't delay - make your way to the safety shower as quickly as possible. It bears repeating that the longer a corrosive chemical is in contact with flesh, the graver the injury will become.

Before entering the safety shower, it is important to remove all clothing and jewelry. Fabrics can become easily saturated with harmful chemicals and keep them in close contact with the skin, causing severe injuries.

Of course, most people feel uncomfortable about the idea of stripping naked in front of their work colleagues, but removing clothing is an essential part of the decontamination process - and besides, protecting yourself from injury is more important than saving face.

Operating a safety shower

Safety showers are designed to be simple to use. Most are operated by means of a pull lever. Once the lever has been pulled, the shower will discharge water at a specific rate and volume for at least 15 minutes, in line with the ANSI regulations.

You should stay under the stream of water for at least 15 minutes to ensure thorough decontamination. It is advisable to stay in the shower for as long as possible until medical help arrives.

When using the safety shower, be careful not to get the stream of water into your eyes, since the rate at which it is discharged is enough to cause damage. If your eyes have been contaminated with an injurious substance, you should thoroughly sluice them using an eyewash station. A combination safety shower and eye wash unit should be used in situations where both the skin and eyes have been contaminated.

In some cases, the water provided by an outdoor safety shower may be discoloured by rust; however, this is no cause for concern, and you should enter the shower immediately, rather than waiting for the stream to run clear.

For more information on safety showers, including different shower types and installation guidelines, visit our ultimate guide to emergency showers.

Posted by Iconography Ltd
2nd October 2017

User Guide: How To Use An Emergency Eye Wash Station

How to Use an Eyewash Station in an Emergency

In an emergency scenario, an eyewash station can save your sight - if it's properly used. Such accidents are fortunately very rare, but it's paramount that you and your colleagues are prepared should the worst happen. Read on to find out how to use an emergency eye wash unit the right way

Don't delay

The second a hazardous material enters your eyes, you should make your way to an eyewash station. According to ANSI regulations, these should be located no more than a ten-second walk away from any hazard. All safety equipment should also be clearly signposted. Make sure you know the location of relevant safety fixtures before handling any hazardous substances.

Don't hesitate, even if it's only a minor spill - the longer a hazardous substance is in contact with the eye, the more damage it does. Even small amounts of contamination can cause serious injury and even permanent loss of vision.

Activate the unit

Push the activation lever on the eyewash station. In order to be compliant with ANSI regulations, the lever will be clearly marked and operable with a single easy motion. All staff should already have been shown how eyewash stations are activated.

When the lever has been pushed, the dust covers will pop open and each of the two eyewash nozzles will begin discharging water.

Flush out your eyes

Once activated, the eyewash station will continue to discharge water for a minimum of 15 minutes, meaning that it can be operated hands-free.

Using your fingers to keep your eyelids open, lower your eyes into the stream of water issuing from the nozzles. Roll your eyes gently up and down and from side to side, ensuring that the water reaches as much of the eyeballs as possible.

Contact lenses

If you wear contacts, gently remove them once you have begun the flushing process. While failing to remove contact lenses can prevent the eye wash from properly irrigating the eyes, it is important not to delay flushing in order to take them out. Only do this once flushing has begun.

Keep on flushing

Continue to use the eyewash station in this manner for a full 15 minutes, and no less. This is the minimum amount of time that it takes to sufficiently clear the eyes of harmful chemicals - if you remove your eyes from the stream before this time has elapsed, you run the risk of permanent injury.

After flushing

When the 15 minute flushing period is over, seek medical assistance immediately. Have a colleague drive you to the accident and emergency department of your local hospital. Do not be tempted to drive yourself, as your vision may be impaired.

Posted by Iconography Ltd
26th October 2017

LabLearner
The Science of Learning
Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MATERIAL SAFETY DATA SHEET

MSDS No.: AA0025
Revision Date: April 1, 2008
Approved by: James A. Bertsch

MSDS No.: AA0025

Section 1 Chemical Product and Company Information

Product	**ACETONE**
Synonyms	2-Propanone; Dimethyl ketone; Solvent

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Acetone	67-64-1	100%	TWA: 500 ppm; STEL: 750 ppm (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE!
CAUSES EYE AND SKIN IRRITATION.
Do not use or store near heat, sparks or flame. Keep container closed. Use only in a well-ventilated area. Avoid contact with skin and eyes. Avoid prolonged or repeated breathing of vapor.
Target organs: Central nervous system.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	2
Fire	3
Reactivity	0
Contact	1

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Fires involving a small amount of combustibles may be smothered by dry chemical. Acetone is extremely flammable and its vapors form explosive mixtures with air. Dangerous when exposed to heat, sparks, flame or oxidizing agents.

Extinguishing Media: Carbon dioxide, dry chemical, water spray, alcohol foam.
Flash Point: ~ 20°C (-4°F) Closed Cup
Autoignition temperature: 465°C (869°F)
Explosion Limits: Lower: 2.5% **Upper:** 12.8%

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 127)

Section 7 Handling & Storage — FLAMMABLE STORAGE CODE RED

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale vapors, spray or mist. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: Use a chemical fume hood and/or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical & Chemical Properties

Physical state: Liquid.
Appearance: Clear, colorless.
Odor: Pungent odor.
pH: N/A
Vapor pressure (mm Hg): 180
Vapor Density (Air = 1): 2.00
Evaporation rate (Butyl acetate = 1): 7.7
Viscosity: N/A
Boiling point: 56°C (133°F)
Freezing / Melting point: -95°C (-139°F)
Decomposition temperature: N/A
Solubility: Complete.
Specific gravity (H_2O = 1): 0.8
Percent volatile (%): 100%
Molecular formula: CH_3COCH_3
Molecular weight: 58.08

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition.

Incompatibilities with other materials: Chloroform, chromic anhydride, hydrogen peroxide, nitric compounds, acids, strong oxidizers, alkalies.

Hazardous decomposition products: Oxides of carbon.

Section 11 Toxicological Information

Effects of overexposure: Inhalation of this material is irritating to the eyes, nose and throat. High vapor concentrations may result in headache, dizziness and nausea. Repeated skin contact causes defatting and chapping and drying. Contact with eyes causes severe irritation, redness and swelling. Slightly toxic by ingestion. Causes nausea, vomiting, headache, dizziness and unconsciousness. Aspiration hazard. Repeated or prolonged exposure may cause liver and kidney damage.

ORL-RAT LD50: 5800 mg/kg
IHL-RAT LC50: 50100 mg/m3/8H
SKN-RBT LD50: 20 g/kg

Section 12 Ecological Information

Do not flush into surface water or sanitary sewer system. Non-toxic to aquatic life. Readily biodegradable.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: UN1090
Shipping name: Acetone
Hazard class: 3
Packing group: II
Exceptions: Ltd Qty • 1 Lt.

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (200-662-2), RCRA code U002

Section 16 Additional Information

MATERIAL SAFETY DATA SHEET

LabLearner™ The Science of Learning
Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: AA0135 AA0136 AA0143 AA0144 AA0145 AA0146 AA0147
Effective Date: January 1, 2007

SECTION I NAME

Product	Aluminum Metal
Chemical Synonyms	Granular, Shot, Sheet, Strips, Turnings
Formula	Al
Unit Size	up to 2.5 Kg.
C.A.S. No.	7429-90-5

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA

Health	0
Fire	1
Reactivity	1

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Aluminum metal	>99.5	See Section V.
CAUTION! INHALATION AS DUST OR FUME MAY CAUSE IRRITATION.		

SECTION III PHYSICAL DATA

Melting Point (°F)	660°C (1220°F)	Specific Gravity (H_2O = 1)	N/A
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	0.095 - 0.113 lb/in^3		
Solubility in Water	Insoluble.		
Appearance & Odor	Silver gray colored metal, granular, shot, sheet, strips, turnings. No odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume	Lower	Upper
N/A	N/A		

Extinguisher Media: Halogenated extinguishing agents should not be used. To control the spread of fire, do not use water. Ring small fire with sand, eliminate drafts, let fire extinguish itself.

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Dust clouds may be explosive. Prevent formation of a dust cloud. Bulk dust when damp may heat spontaneously. Hazard greater as fineness increases. Reacts with some acids and caustic solutions to produce hydrogen. Molten aluminum may explode on contact with water. It may also react violently with rust, certain metal oxides (e.g. oxides of copper, iron and lead) and nitrates (e.g. ammonium nitrate and fertilizers containing ammonium nitrate).

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA AA0135

Threshold Limited Value: TWA: 10 mg/m^3 (ACGIH 2001) as aluminum metal dust.

Effects of Overexposure: **INGESTION:** May cause irritation. Exercise appropriate procedures to minimize potential hazards. **EYES:** Particles of aluminum in the eye may cause injury to the cornea. **INHALATION:** It has been reported in the literature that chronic exposure to aluminum dust has been suspected of causing lung injury. Target organs: None known.

Emergency and First Aid Procedures: **INGESTION:** Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Heat, spark, flame, water and strong oxidizing agents.
	Stable	X	

Incompatibility (Materials to Avoid): Strong oxidizers, acids, alkalies, halogenated compounds, heat and water.

Hazardous Decomposition Products: Aluminum reacts with water, acids or alkalies to generate hydrogen.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Recover when possible. Sweep material onto paper. Place in a fiber carton. Wash spill area well with soap and water.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None needed in normal laboratory handling. If dusty conditions prevail, wear a NIOSH/MSHA-approved dust mask or work in ventilation hood.

Ventilation				
Local Exhaust	Recommended.	Special	No.	
Mechanical (General)	Recommended.	Other	No.	

Protective Gloves: Rubber. **Eye Protection:** Chemical safety glasses.

Other Protective Equipment: Goggles, safety glasses, lab coat, fire extinguisher, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Store in a dry place away from acids, alkalies and oxidizers. Dangerous when wet, take precautions. Wash thoroughly after handling.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Sheets and/or strips have sharp edges. Use caution when handling. Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
12	01/01/07	James A. Bertsch	JAB

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MATERIAL SAFETY DATA SHEET

Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: AA0271
Effective Date: August 25, 2008

SECTION I NAME

Product	Ammonium Hydroxide, 0.75 Molar Solution
Chemical Synonyms	Ammonium Hydroxide, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA: 0 / 1 / 1

HMIS *	
Health	1
Fire	0
Reactivity	1

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Ammonium hydroxide: (CAS No. 1336-21-6)	~ 1.28% as Ammonia	25 ppm in air as ammonia
Water: (CAS No. 7732-18-5)	~99%	None established.
CAUTION!		
HARMFUL IF SWALLOWED. CAUSES IRRITATION.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes @ 0°C (32°F)	Specific Gravity (H_2O = 1)	~ 1.0
Boiling Point (°F)	~ 100°C (212°F)	Percent Volatile by Volume (%)	100%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	> 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Water, white liquid; strong ammonia odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

			Lower	Upper
Flash Point (Method Used)	N/A	Flammable Limits in Air % by Volume N/A		
Extinguisher Media	Use any media for extinguishing the supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

Wear full protective clothing with respirator mask having ammonia vapor canister, or NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as fume.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

AA0271

Threshold Limited Value
As Ammonia gas TWA: 25 ppm; STEL: 35 ppm (ACGIH 2001).
Oral Rat-LD50 350 mg/Kg.

Effects of Overexposure
Material is extremely destructive to tissue of the mucous membranes, upper respiratory, gastrointestinal and digestive tract, eyes and skin. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of overexposure may include burning sensation, shortness of breath, headache, nausea, vomiting, convulsions and shock. Target organs: Eyes, skin and mucous membranes.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Excessive temperature.
	Stable	X	

Incompatibility (Materials to Avoid) Acids, strong oxidizers, halogens, heavy metals.

Hazardous Decomposition Products Decomposes to ammonia gas and above 450°C (842°F) to hydrogen gas and nitrogen oxides.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Wearing protective equipment, carefully neutralize with sodium bisulfate. Absorb with inert dry material and place in suitable container for proper disposal.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with Federal, State and Local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) Work in ventilation hood or wear a NIOSH/MSHA-approved respirator with ammonia canister if necessary.

Ventilation				
	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves	Rubber.	Eye Protection	Chemical safety goggles.

Other Protective Equipment Faceshield, lab coat, vented hood, proper gloves, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.

Store at 75°F. Store away from sources of ignition, separate from acids. Store in a well-ventilated area. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with eyes, skin and mucous membranes. Avoid breathing vapor. Use with adequate ventilation. Remove and wash contaminated clothing.

Revision No. 1	Date 08/25/08	Approved James A. Bertsch	Chemical Safety Coordinator JAB

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MATERIAL SAFETY DATA SHEET

Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: AA0272
Effective Date: August 25, 2008

SECTION I NAME

Product	Ammonium Hydroxide, 1.5 Molar Solution
Chemical Synonyms	Ammonium Hydroxide, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	0
Reactivity	1

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Ammonium hydroxide: (CAS No. 1336-21-6)	~ 2.55% as Ammonia	25 ppm in air as ammonia
Water: (CAS No. 7732-18-5)	~99%	None established.
CAUTION!		
HARMFUL IF SWALLOWED. CAUSES IRRITATION.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes @ 0°C (32°F)	Specific Gravity (H_2O = 1)	~ 1.0
Boiling Point (°F)	~ 100°C (212°F)	Percent Volatile by Volume (%)	100%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	> 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Water, white liquid; strong ammonia odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	N/A	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use any media for extinguishing the supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

Wear full protective clothing with respirator mask having ammonia vapor canister, or NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as fume.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

AA0272

Threshold Limited Value
As Ammonia gas TWA: 25 ppm; STEL: 35 ppm (ACGIH 2001).
Oral Rat-LD50 350 mg/Kg.

Effects of Overexposure
Material is extremely destructive to tissue of the mucous membranes, upper respiratory, gastrointestinal and digestive tract, eyes and skin. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of overexposure may include burning sensation, shortness of breath, headache, nausea, vomiting, convulsions and shock. Target organs: Eyes, skin and mucous membranes.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Excessive temperature.
	Stable	X		

Incompatibility (Materials to Avoid) Acids, strong oxidizers, halogens, heavy metals.

Hazardous Decomposition Products Decomposes to ammonia gas and above 450°C (842°F) to hydrogen gas and nitrogen oxides.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Wearing protective equipment, carefully neutralize with sodium bisulfate. Absorb with inert dry material and place in suitable container for proper disposal.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with Federal, State and Local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) Work in ventilation hood or wear a NIOSH/MSHA-approved respirator with ammonia canister if necessary.

Ventilation	**Local Exhaust**	Recommended.	**Special**	No.
	Mechanical (General)	Recommended.	**Other**	No.
Protective Gloves	Rubber.	**Eye Protection**	Chemical safety goggles.	
Other Protective Equipment	Faceshield, lab coat, vented hood, proper gloves, eye wash station.			

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.
Store at 75°F. Store away from sources of ignition, separate from acids. Store in a well-ventilated area. Wash thoroughly after handling.

Other Precautions
Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with eyes, skin and mucous membranes. Avoid breathing vapor. Use with adequate ventilation. Remove and wash contaminated clothing.

Revision No. 1	Date 08/25/08	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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www.LabLearner.com
1.877.LEARN78

MSDS No.: AA0274
Effective Date: January 1, 2007

SECTION I NAME

Product	Ammonium Hydroxide, 3M (3N)
Chemical Synonyms	Ammonium Hydroxide, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA: 0 / 2 / 1

Health	2
Fire	0
Reactivity	1

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Ammonium hydroxide: (CAS No. 1336-21-6)	~ 5% as Ammonia	25 ppm in air as ammonia
Water: (CAS No. 7732-18-5)	~95%	None established.
WARNING! CORROSIVE!		
HARMFUL IF SWALLOWED OR INHALED. CAUSES BURNS.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes @ 0°C (32°F)	Specific Gravity (H_2O = 1)	~ 1.0
Boiling Point (°F)	~ 100°C (212°F)	Percent Volatile by Volume (%)	100%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	> 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Water, white liquid; strong ammonia odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

			Lower	Upper
Flash Point (Method Used)	N/A	Flammable Limits in Air % by Volume N/A		
Extinguisher Media	Use any media for extinguishing the supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

Wear full protective clothing with respirator mask having ammonia vapor canister, or NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors formed from this product are heavier than air and may travel along the ground to a distant source of ignition. Fire may produce irritating, corrosive and/or toxic fumes.

D.O.T. Non Regulated.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

AA0274

Threshold Limited Value

As Ammonia gas TWA: 25 ppm; STEL: 35 ppm (ACGIH 2001).
Oral Rat-LD50 350 mg/Kg.

Effects of Overexposure

May cause severe irritation or burns to eyes, skin and mucous membranes; highly toxic by oral and inhalation routes. Inhalation of ammonia gas causes edema, spasm and asphyxia. Open cap slowly with adequate ventilation; a sudden release of ammonia fumes may cause irritation to eyes and mucous membranes. Target organs: Eyes, skin and mucous membranes.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**
	Stable	X	Excessive temperature.

Incompatibility (Materials to Avoid) Acids, strong oxidizers, halogens, heavy metals.

Hazardous Decomposition Products Decomposes to ammonia gas and above 450°C (842°F) to hydrogen gas and nitrogen oxides.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	
	X	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Wearing protective equipment, carefully neutralize with sodium bisulfate. Absorb with inert dry material and place in suitable container for proper disposal.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with Federal, State and Local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) Work in ventilation hood or wear a NIOSH/MSHA-approved respirator with ammonia canister if necessary.

Ventilation	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.
Protective Gloves	Rubber.		**Eye Protection**	Chemical safety goggles.

Other Protective Equipment Faceshield, lab coat, vented hood, proper gloves, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store at 75°F. Store away from sources of ignition, separate from acids. Store in a well-ventilated area. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with eyes, skin and mucous membranes. Avoid breathing vapor. Use with adequate ventilation. Remove and wash contaminated clothing.

Revision No. 2	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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MSDS No.: AA0425
Effective Date: January 1, 2007

SECTION I NAME

Product	L+Ascorbic Acid
Chemical Synonyms	Vitamin C
Formula	$C_6H_8O_6$
Unit Size	up to 2.5 Kg.
C.A.S. No.	50-81-7

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	1
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Ascorbic acid	100%	None established.
CAUTION! MAY CAUSE IRRITATION.		

SECTION III PHYSICAL DATA

Melting Point (°F)	190-192°C (374-377°F)	Specific Gravity (H_2O = 1)	1.65
Boiling Point (°F)	Decomposes.	Percent Volatile by Volume (%)	Negligible as solid.
Vapor Pressure (mm Hg)	Negligible as solid.	Evaporation Rate (=1)	Not applicable.
Vapor Density (Air=1)	Unknown.		
Solubility in Water	30% by weight at 20°C.		
Appearance & Odor	White to slightly off-white granular powder or crystals. Nearly odorless.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume (g/cu. ft.)	Lower	Upper
Non-flammable.		10	20

Extinguisher Media: Use any media suitable for extinguishing supporting fire.

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Fire or excessive heat may produce hazardous decomposition products; can react vigorously with oxidizing materials. Slight fire hazard when exposed to heat or flame. Dust-air mixtures may ignite or explode.
Auto-ignition temperature: 660°C (1220°F).

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA AA0425

Threshold Limited Value: None established by ACGIH 2001.

Effects of Overexposure

May be a mild eye, skin or respiratory irritant. May cause gastrointestinal irritation. Exercise appropriate procedures to minimize potential hazards. Target organs: Blood, kidneys.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		(Promotes oxidation.) Moisture, light especially if in aqueous solution.
	Stable	X	

Incompatibility (Materials to Avoid): Alkalis, iron, copper, water, oxidizing agents, acids.

Hazardous Decomposition Products: Combustion will produce carbon dioxide and probably carbon monoxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	
	X	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Sweep up spilled material and place in a suitable container for disposal. Wash spill area with soap and water.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None should be needed in normal laboratory handling. If dusty conditions prevail work in ventilation hood or wear NIOSH/MSHA-approved dust mask.

Ventilation				
Local Exhaust	Recommended.	Special	No.	
Mechanical (General)	Recommended.	Other	No.	

Protective Gloves: Rubber, if sensitive to irritation. **Eye Protection**: Chemical safety glasses.

Other Protective Equipment: Safety goggles, lab coat or apron, eye wash station, proper gloves.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Keep container tightly closed, in a dark, moisture-free place at temperatures below 33°C (72°F). Keep away from strong oxidizing agents or acids.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Protect from exposure and light. Remove and wash contaminated clothing.

Revision No. 7	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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1.877.LEARN7B

MSDS No.: CC0055
Effective Date: January 1, 2007

SECTION I NAME

Product	Calcium Carbonate, Powder
Chemical Synonyms	Limestone; Precipitated Calcium Carbonate
Formula	$CaCO_3$
Unit Size	up to 2.5 Kg
C.A.S. No.	1317-65-3

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Calcium Carbonate	>97%	See Section V.
CAUTION! MAY CAUSE IRRITATION TO SKIN,		
EYES AND RESPIRATORY TRACT.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Decomposes 825°C (1517°F)	Specific Gravity (H_2O = 1)	2.7
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	0.0014 g/100 mL.		
Appearance & Odor	White powder; odorless.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume N/A	Lower	Upper
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved, self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

The fumes evolved by burning calcium carbonate in air are composed of Calcium Oxide (quick lime). This material is irritating to the skin, eyes, and mucous membranes.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA CC0055

Threshold Limited Value

TWA: 10 mg/m^3 ACGIH 1992-93.

Effects of Overexposure

Inhalation of respirable dusts may aggravate respiratory tract. Exposure to dust may irritate skin and eyes. Ingestion should not cause any health problems. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**
	Stable	X	Not applicable.

Incompatibility (Materials to Avoid) Will react with acids.

Hazardous Decomposition Products Reacts with acids to produce CO_2.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	
	X	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Care should be taken to avoid causing dust to become airborne. Sweep or vacuum up and place in a suitable container for disposal. Vacuum cleaning systems are recommended. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Uncontaminated material may be disposed of in a sanitary landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Ventilation	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves Rubber. **Eye Protection** Chemical safety glasses.

Other Protective Equipment Goggles, smock, apron, proper gloves, and eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry place away from acids. Product becomes slippery when moistened. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Do not breathe dust.
Remove and wash contaminated clothing.

Revision No. 7	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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1.877.LEARN78

MSDS No.: CC0060
Effective Date: January 1, 2007

SECTION I NAME

Product	Calcium Carbonate, Chips
Chemical Synonyms	Marble Chips, Boiling Chips
Formula	$CaCO_3$
Unit Size	up to 12 Kg.
C.A.S. No.	471-34-1

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	0
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Calcium Carbonate, Chips	>99%	See Section V.

CAUTION! USE EXTREME CARE IN THE USE OF MARBLE CHIPS IN GENERATING CO_2.

SECTION III PHYSICAL DATA

Melting Point (°F)	Decomposes 826°C (1520°F)	Specific Gravity (H_2O = 1)	2.85
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (Butyl acetate =1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	0.001% @ 0°C; 0.002% @ 100°C.		
Appearance & Odor	White stone chips; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower: N/A	Upper:
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

The fumes evolved by burning calcium carbonate in air is composed of calcium oxide (quick lime). This material is irritating to the skin, eyes, and mucous membranes.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA CC0060

Threshold Limited Value

Calcium carbonate, powder: TWA: 10 mg/m^3 ACGIH, 2001.

Effects of Overexposure

Low hazard as chips. Inhalation of respirable dusts may aggravate respiratory tracts. Exposure to dust may irritate skin and eyes. Ingestion should not cause any health problems. Exercise appropriate procedures to minimize potential hazards. Target rorgans: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Acids.
	Stable	X	

Incompatibility (Materials to Avoid) Will react with acids.

Hazardous Decomposition Products Reacts with acids to produce carbon dioxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Recover as much as possible for use. Vacuum or sweep up and place in a suitable container for proper disposal. Care should be taken to avoid causing dust to become airborne. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Ventilation				
	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves		Eye Protection	
	Leather or rubber.		Chemical safety glasses.

Other Protective Equipment Goggles, lab coat, proper gloves, proper ventilation if dusty.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a dry place away from acids.
Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Do not add acid to marble chips in a closed container, dangerous explosion may result. Remove and wash contaminated clothing.

Revision No. 7	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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CC0252
MSDS No.: CC0260 CC0265
Effective Date: January 1, 2007

SECTION I NAME

Product	Charcoal, Wood
Chemical Synonyms	Wood Charcoal
Formula	C
Unit Size	up to 2.5 Kg.
C.A.S. No.	7440-44-0

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	0
Fire	1
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Charcoal, wood	100%	None established.

WARNING! DO NOT USE FOR INDOOR HEATING OR COOKING UNLESS VENTILATION IS PROVIDED FOR EXHAUSTING FUMES TO OUTSIDE. TOXIC FUMES MAY ACCUMULATE AND CAUSE DEATH.

SECTION III PHYSICAL DATA

Melting Point (°F)	Not applicable.	Specific Gravity (H_2O = 1)	250-600 g/l
Boiling Point (°F)	4200°C (7624°F)	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	Negligible as solid.	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	Not applicable.		
Solubility in Water	Insoluble in water and/or organic solvents.		
Appearance & Odor	Black lumps, powder, granules or sticks; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-volatile solid.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Water fog; foam; carbon dioxide; dry chemical.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved, self-contained breathing apparatus and protective clothing.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.7, GUIDE PAGE NO. 133)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Airborne dust is a weak explosion hazard. Fire or excessive heat may produce hazardous decomposition products; can react vigorously with oxidizing materials.

D.O.T. Charcoal, 4.2, NA1361, PG III, Ltd Qty - 5 Kg.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA CC0265

Threshold Limited Value
None established by ACGIH 2001.

Effects of Overexposure
INGESTION: Relatively harmless. **EYE CONTACT:** This material will probably cause some mild irritation. **SKIN CONTACT:** Prolonged or repeated contact may cause irritation. **INHALATION:** Repeated or prolonged exposure to excessive dust may cause pulmonary disorders. Target organs: None known.

Emergency and First Aid Procedures
INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Excessive temperature and heat.
	Stable	X	

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Thermal decomposition on burning may produce carbon monoxide and/or carbon dioxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled
Sweep up and place in a suitable container for reclamation or proper disposal. Wash spill area with soap and water.

Waste Disposal Method
Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.
Dispose of in an approved incinerator or uncontaminated material may be disposed of in a sanitary landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Ventilation				
	Local Exhaust	Yes.	Special	No.
	Mechanical (General)	If dusty.	Other	No.

Protective Gloves		Eye Protection	
	None required.		Chemical safety glasses.

Other Protective Equipment Goggles, smock, apron, fire extinguisher, eye wash station, and a ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.
Store in a dry area, away from fire hazards and oxidizing materials. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Remove and wash contaminated clothing.

Revision No. 8	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

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MATERIAL SAFETY DATA SHEET

MSDS No.: CC0416
Revision Date: April 1, 2008
Approved by: James A. Bertsch

MSDS No.: CC0416

Section 1 Chemical Product and Company Information

Product	**COPPER METAL**
Synonyms	N/A

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Copper	7440-50-8	100%	TWA: 1.0 mg/m^3 dusts and mists as Cu TWA: 0.2 mg/m^3 fume (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

CAUTION!

DO NOT BREATHE METAL DUST OR FUMES. SHARP EDGES.

May be harmful if swallowed. Harmful if inhaled as dust or fume. May cause irritation to skin and eyes. Avoid contact with Nitric acid, emits toxic fumes of nitrogen oxides. Target organs: Liver, kidneys.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	0
Fire	0
Reactivity	0
Contact	0

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Non-flammable and non-combustible solid, but air-born dust may ignite. Do not use water to fight fires involving this material.

Extinguishing Media: Use triclass, dry chemical fire extinguisher.

Flash Point: Non-combustible.

Autoignition temperature: N/A

Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

None listed.

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage — GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale dust. Wash thoroughly after handling. Remove and wash clothing before reuse.

Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Section 9 Physical & Chemical Properties

Physical state: Solid.
Appearance: Reddish-brown, lustrous metal.
Odor: No odor.
pH: N/A
Vapor pressure (mm Hg): 1 mm @ 1628°C
Vapor Density (Air = 1): N/A
Evaporation rate (Butyl acetate = 1): N/A
Viscosity: N/A
Boiling point: 2595°C (4703°F)
Freezing / Melting point: 1083°C (1981°F)
Decomposition temperature: N/A
Solubility: Insoluble.
Specific gravity (H_2O = 1): 8.92 @ 20°C
Percent volatile (%): N/A
Molecular formula: Cu
Molecular weight: 63.55

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition. Acids.

Incompatibilities with other materials: Strong acids, oxidizers, alkalies, bromates, chlorates, iodates, sodium azide, acetyline and halogens.

Hazardous decomposition products: Nitrogen oxide is reacted with nitric acid.

Section 11 Toxicological Information

Effects of overexposure: Inhalation of this material can cause intense sneezing, nausea, vomiting, weakness and metal fume fever. Ingestion of this material may cause moderate irritation to the stomach lining. If product gets into eyes, corneal abrasions may occur. May cause irritation on contact with skin. Repeated or prolonged exposure may cause liver and kidney damage, with an increased risk with Wilson's disease.

ORL-RAT LD50: N/A
RTECS #: GL5325000

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-159-6), RCRA code D001, Ca Prop 65-Not listed.

Section 16 Additional Information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. * Hazardous Materials Industrial Standards.

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MATERIAL SAFETY DATA SHEET

MSDS No.: CC0420
Revision Date: April 1, 2008
Approved by: James A. Bertsch

Section 1 Chemical Product and Company Information

Product	**COPPER METAL**
Synonyms	N/A

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Copper	7440-50-8	100%	TWA: 1.0 mg/m^3 dusts and mists as Cu TWA: 0.2 mg/m^3 fume (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

CAUTION!
DO NOT BREATHE METAL DUST.
May be harmful if swallowed. Harmful if inhaled as dust or fume. May cause irritation to skin and eyes. Avoid contact with Nitric acid, emits toxic fumes of nitrogen oxides. Target organs: Liver, kidneys.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	0
Fire	0
Reactivity	0
Contact	0

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

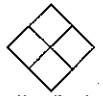
Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Non-flammable and non-combustible solid, but air-born dust may ignite. Do not use water to fight fires involving this material.

Extinguishing Media: Use triclass, dry chemical fire extinguisher.
Flash Point: Non-combustible.
Autoignition temperature: N/A
Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe



None listed.

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage — GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale dust. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Section 9 Physical & Chemical Properties

Physical state: Solid.
Appearance: Reddish-brown, lustrous metal.
Odor: No odor.
pH: N/A
Vapor pressure (mm Hg): 1 mm @ 1628°C
Vapor Density (Air = 1): N/A
Evaporation rate (Butyl acetate = 1): N/A
Viscosity: N/A
Boiling point: 2595°C (4703°F)
Freezing / Melting point: 1083°C (1981°F)
Decomposition temperature: N/A
Solubility: Insoluble.
Specific gravity (H_2O = 1): 8.92 @ 20°C
Percent volatile (%): N/A
Molecular formula: Cu
Molecular weight: 63.55

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition. Acids.

Incompatibilities with other materials: Strong acids, oxidizers, alkalies, bromates, chlorates, iodates, sodium azide, acetyline and halogens.

Hazardous decomposition products: Nitrogen oxide is reacted with nitric acid.

Section 11 Toxicological Information

Effects of overexposure: Inhalation of this material can cause intense sneezing, nausea, vomiting, weakness and metal fume fever. Ingestion of this material may cause moderate irritation to the stomach lining. If product gets into eyes, corneal abrasions may occur. May cause irritation on contact with skin. Repeated or prolonged exposure may cause liver and kidney damage, with an increased risk with Wilson's disease.

ORL-RAT LD50: N/A
RTECS #: GL5325000

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-159-6), RCRA code D001, Ca Prop 65-Not listed.

Section 16 Additional Information

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MATERIAL SAFETY DATA SHEET

MSDS No.: DD0012
Revision Date: May 16, 2008
Approved by: James A. Bertsch

MSDS No.: DD0012

Section 1 Chemical Product and Company Information

Product	**DEIONIZED WATER**
Synonyms	Hydrogen Oxide

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Deionized water	7732-18-5	100%	None established. (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

NON-HAZARDOUS.
Avoid contact with water reactive materials.
Target organs: None known.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	0
Fire	0
Reactivity	0
Contact	0

HMIS *

Section 4 First Aid Measures

Uncontaminated water should not pose any ill health effects.
If ill effects develop, get immediate medical attention.

Section 5 Fire Fighting Measures

General information: Avoid contact with Dangerous when wet and water reactive materials. See Section 10.

Extinguishing Media: N/A
Flash Point: N/A
Autoignition temperature: N/A
Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

None listed.

Section 6 Accidental Release Measures

Uncontaminated material may be flushed to sewer.

Section 7 Handling & Storage GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed to avoid absorption of fumes and carbon dioxide from air. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Handling: Avoid contamination.

Storage: Store in a cool, area away from water reactive or dangerous when wet substances.

Section 8 Exposure Controls / Personal Protection

Engineering controls: N/A

Respiratory protection: N/A

Section 9 Physical & Chemical Properties

Physical state: Liquid.
Appearance: Clear, colorless.
Odor: No odor.
pH: N/A
Vapor pressure (mm Hg): 14
Vapor Density (Air = 1): 0.7
Evaporation rate (Water = 1): 1
Viscosity: N/A
Boiling point: 100°C (212°F)
Freezing / Melting point: 0°C (32°F)
Decomposition temperature: N/A
Solubility: Complete.
Specific gravity (H_2O = 1): 0.99707 @ 20°/20°C
Percent volatile (%): 100%
Molecular formula: H_2O
Molecular weight: 18.01

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Absorption of fumes and carbon dioxide gas.

Incompatibilities with other materials: Water reactive metals: sodium, potassium, calcium, barium, alkali metal alloys, liquid, amalgams, amides, carbides, hydrides, aluminum powders, sillicides, cerium, concentrated acids.

Hazardous decomposition products: Electrolysis will produce explosive and flammable hydrogen and oxygen.

Section 11 Toxicological Information

Effects of overexposure: None known when used at normal temperatures and pressure. Contact with eyes should have no ill effects, although contact with any material not specifically labeled for eye use or care should be avoided.

ORL-RAT LD50: N/A
IHL-RAT LC50: N/A
SKN-RBT LD50: N/A

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

Not listed.

Section 16 Additional Information

MATERIAL SAFETY DATA SHEET

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MSDS No.: EE0076
Effective Date: January 5, 2007

SECTION I NAME

Product	Ethyl Alcohol, Denatured, 95%
Chemical Synonyms	N/A
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA: 3 (top), 2 (left), 0 (right)

Health	1
Fire	3
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Ethyl alcohol, denatured*: (CAS No. 64-17-5)	95%	1000 ppm
Water: (CAS No. 7732-18-5)	5%	None established.
DANGER! FLAMMABLE! VAPOR HARMFUL. MAY BE FATAL		
OR CAUSE BLINDNESS IF SWALLOWED.		

SECTION III PHYSICAL DATA

Melting Point (°F)	-114°C (-173°F)	Specific Gravity (H_2O = 1)	0.794 @ 60°F
Boiling Point (°F)	75-80°C (173-174°F)	Percent Volatile by Volume (%)	100%
Vapor Pressure (mm Hg)	44.6 mm @ 20°C (68°F)	Evaporation Rate (Butyl acetate =1)	4.1
Vapor Density (Air=1)	1.59		
Solubility in Water	Complete.		
Appearance & Odor	Clear, colorless, mobile liquid; mild characteristic odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume	Lower	Upper
10°C (50°F) TCC		3.3	19.0

Extinguisher Media: Dry chemical; Alcohol-resistant foam; or carbon dioxide; water spray or fog.

SPECIAL FIREFIGHTING PROCEDURES

If involved in fire situation, wear a NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Water may be ineffective, but water should be used to keep fire exposed containers cool. If a leak or spill has not ignited, use water spray to disperse vapors. Water spray may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

Autoignition Temperature: 363°C (685°F)

*Denaturants:
Isopropyl Alcohol: (CAS No. 67-63-0)
Methyl Alcohol: (CAS No. 67-56-1)

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.7, GUIDE PAGE NO. 127)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors formed from this product may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge or other ignition sources at location distant from handling source. **CAUTION:** Flame may not be visible in daylight. Fire or excessive heat may produce hazardous decomposition products; can react vigorously with oxidizing materials.

D.O.T. UN1170, Ethanol, 3, PG II, Ltd Qty - 1 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA EE0076

Threshold Limited Value: Ethyl Alcohol: PEL/TLV 1000 ppm; Isopropyl Alcohol: TWA: 400 ppm, STEL: 500 ppm; Methyl Alcohol: PEL-TWA: 200 ppm, STEL: 250 ppm

Effects of Overexposure: **INGESTION:** Can cause central nervous system depression, nausea, vomiting, diarrhea. **INHALATION:** May cause headache, drowsiness, loss of appetite, inability to concentrate and irritation of the throat. **EYES:** Liquid or vapor may cause irritation. **SKIN:** May cause irritation and defatting of skin on prolonged contact. **OTHER:** Individual responses to Methyl Alcohol vary. Ingestion of less than 30 mL. has been fatal to humans. In general a few ounces may cause blindness and death, as little as 4 mL. may be toxic if ingested. Target organs: Eyes, central nervous system, liver, kidneys.

Emergency and First Aid Procedures: **INGESTION:** Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Excessive temperature and heat. Strong oxidizers. Sparks, flame and ignition sources.
	Stable	X	

Incompatibility (Materials to Avoid): Contact with acetyl chloride and a wide range of oxidizing agents may react violently. Vapors may form flammable mixtures with air.

Hazardous Decomposition Products: Carbon monoxide can form on incomplete combustion.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Wearing proper safety equipment and with adequate ventilation, remove all sources of ignition. Absorb with an inert dry material and place in suitable container for proper disposal.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): Do not use in confined area. If required, work in fume hood with NIOSH/MSHA approved respiratory equipment.

Ventilation				
	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	Adequate to maintain below exposure limit.

Protective Gloves		Eye Protection	
	Rubber.		Chemical safety goggles.

Other Protective Equipment: Lab coat, apron, eye wash station, proper gloves, ventilation hood, fire extinguisher.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Store in a cool, dry, well-ventilated area, away from heat, sparks and ignition sources. Store separately from oxidizing materials. Wash thoroughly after handling. Do not take internally.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Use with adequate ventilation. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Remove and wash contaminated clothing.

Revision No. 4	Date 01/05/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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MSDS No.: FF0108
Effective Date: August 6, 2007

SECTION I NAME

Product	Iron (III) Chloride, 0.2 Molar Solution
Chemical Synonyms	Ferric Chloride, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture. See Section II.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA

Health	2
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Iron (III) chloride: (CAS No. 7705-08-0)	3.24%	See Section V.
Water: (CAS No. 7732-18-5)	96.76%	None established.
DANGER! CORROSIVE! HARMFUL IF SWALLOWED. MAY CAUSE		
BURNS TO SKIN, EYES AND MUCOUS MEMBRANES.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes approx. 0°C (32°F)	Specific Gravity (H_2O = 1)	Approx. 1.0
Boiling Point (°F)	Approx. 100°C (212°F)	Percent Volatile by Volume (%)	96.76%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	Slightly < 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Yellow-orange liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

If involved in fire situation, wear a NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 154)

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions resulting in the evaporation of the water of solution hazardous decomposition products may be produced as dust or fume. There are no unusual fire and explosion hazard associated with this solution.

D.O.T. Ferric chloride, solution, 8, UN2582, PG III, Ltd Qty - 5 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA FF0108

Threshold Limited Value

None established for this solution. 1 mg/m^3 as Iron (ACGIH 2001).

Effects of Overexposure

INHALATION: Dust or mist may cause severe respiratory tract irritation, sore throat, cough, dyspnea, and labored breathing. **SKIN:** Direct contact may cause severe irritation, pain and burns. **EYES:** Direct contact with eyes may cause pain, redness, blurred vision and lacrimation. Corneal injury and burns are possible. **INGESTION:** Vomiting, diarrhea, dehydration, shock, cyanosis, rapid respiration, acidosis, drowsiness, hypothermia, imperceptible pulse. Target organs: Cardiovascular and central nervous systems, liver, kidneys.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Excessive temperature to cause evaporation.
	Stable	X		Stable under normal temperatures and pressure.

Incompatibility (Materials to Avoid) Strong oxidizing agents, metals, allyl chloride, sodium, potassium.

Hazardous Decomposition Products Thermal decomposition products may include toxic and corrosive fumes of chlorine, hydrochloric acid, iron and/or iron oxide dust.

Hazardous Polymerization		Conditions to Avoid
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Flush to sewer with copious amounts of water.
Wash spill area with soap and water.

Waste Disposal Method Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Flush to sewer with copious amounts of water.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None needed in normal laboratory handling. If misty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved respirator.

Ventilation	**Local Exhaust**	If misty.	**Special**	No.
	Mechanical (General)	If misty.	**Other**	Adequate to maintain below exposure limit.

Protective Gloves	Rubber.	**Eye Protection**	Chemical safety glasses.

Other Protective Equipment Lab coat, apron, eye wash station, proper gloves.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing
Keep container tightly closed when not in use.

Store in a cool, dry area, away from incompatible substances.
Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with skin, eyes, mucous membranes and clothing.
Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
1	08/06/07	James A. Bertsch	JAB

MATERIAL SAFETY DATA SHEET

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MSDS No.: GG0119 GG0120
Effective Date: January 10, 2007

SECTION I NAME

Product	Glycerin
Chemical Synonyms	Glycerol, 1, 2, 3-Propanetriol
Formula	$HOCH_2CHOHCH_2OH$
Unit Size	up to 20 Lt.
C.A.S. No.	56-81-5

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	1
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Glycerin	> 99.5%	See Section V.

CAUTION! AVOID CONTACT WITH STRONG OXIDIZING MATERIALS.

SECTION III PHYSICAL DATA

Melting Point (°F)	18°C (64°F)	Specific Gravity (H_2O = 1)	1.2607 (25/25°C)
Boiling Point (°F)	~ 260°C (554°F)	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	< 0.01 mbar @ 20°C	Evaporation Rate (Ether =1)	Greater than 1.
Vapor Density (Air=1)	N/A		
Solubility in Water	Complete (100%).		
Appearance & Odor	Clear, water white liquid; no odor. Hygroscopic.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	177°C (351°F) COC	Flammable Limits in Air % by Volume N/A	Lower	Upper
Extinguisher Media	Carbon dioxide; dry chemical; water spray; alcohol foam.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

During burning poisonous Acrolein may be formed. Can react vigorously with oxidizing materials. Contact with strong oxidizing agents such as chromium trioxide, potassium chlorate, or potassium permanganate may produce explosion.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA GG0120

Threshold Limited Value

As mist: TWA: 10 mg/m^3 (ACGIH 2001).

Effects of Overexposure

INGESTION: Very low hazard. Estimating from data, the lethal dose for a 100 pound person may be a quart or more. **EYE CONTACT:** No significant irritation. **SKIN:** No significant irritation. Not absorbed through skin. **INHALATION:** Mists are irritating to respiratory tract. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**	Absorbs moisture from air. Excessive temperature and heat.
	Stable	X		

Incompatibility (Materials to Avoid) Oxidizing agents such as sodium hypochlorite, hypochlorous acid, nitric acid, potassium chlorate, chromium trioxide, potassium permanganate.

Hazardous Decomposition Products Acrolein fumes.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Avoid a condition of excessive heat (in excess of 200°C) while exposed to atmospheric oxygen.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Small spills: Flush to sewer with copious amounts of water.
Large spills: Absorb in sand, vermiculite or other available material and place in a suitable container for disposal by incineration.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved incinerator or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None needed in normal laboratory handling at room temperature and a liquid state.

Ventilation	Local Exhaust	None needed.	Special	No.
	Mechanical (General)	None needed.	Other	No.

Protective Gloves None needed. **Eye Protection** Chemical safety glasses.

Other Protective Equipment Smock, apron, eye wash station, goggles, fire extinguisher.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry place away from strong oxidizers and fire hazards. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Remove and wash contaminated clothing.

Revision No. 10	Date 01/10/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

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MATERIAL SAFETY DATA SHEET

MSDS No.: HH0094
Revision Date: April 1, 2008
Approved by: James A. Bertsch

MSDS No.: HH0094

Section 1 Chemical Product and Company Information

Product	**HYDROCHLORIC ACID, 3 MOLAR (3 NORMAL)**
Synonyms	Muriatic acid, water solution; Hydrogen chloride, water solution

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Hydrochloric acid	7647-01-0	9.43%	TWA: 5 ppm (ACGIH 2001)
Water	7732-18-5	90.57%	None established.

Section 3 Hazards Identification

Emergency Overview

WARNING! CORROSIVE!
HARMFUL IF SWALLOWED. IRRITANT TO EYES AND MUCOUS MEMBRANES. Do not mix with chlorine type bleaches or other household chemicals. Keep away from skin and eyes. Do not inhale or swallow.
Target organs: Respiratory system, skin, eyes, lungs.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	3
Fire	0
Reactivity	2
Contact	4

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General Information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool.

Extinguishing Media: Carbon dioxide, dry chemical, dry sand, alcohol foam.

Flash Point: Not combustible.

Autoignition temperature: N/A

Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation. Neutralize spill with sodium bicarbonate or calcium hydroxide, absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 157)

Section 7 Handling & Storage — CORROSIVE STORAGE CODE WHITE

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale vapors, spray or mist. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Protect from physical damage and sunlight. Protect from moisture.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: Use a chemical fume hood and/or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical & Chemical Properties

Physical state: Fuming liquid.
Appearance: Clear, colorless.
Odor: Pungent odor.
pH: N/A
Vapor pressure (mm Hg): 14 [water]
Vapor Density (Air = 1): 0.7 [water]
Evaporation rate (= 1): N/A
Viscosity: N/A
Boiling point: ~100°C (~212°F) [water]
Freezing / Melting point: ~0°C (~32°F) [water]
Decomposition temperature: N/A
Solubility: Soluble.
Specific gravity (H_2O = 1): 1.0 [water]
Percent volatile (%): 100%
Molecular formula: Mixture.
Molecular weight: Mixture.

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Containers may burst when heated. Avoid contact with water.

Incompatibilities with other materials: Metals, bases, active metals, alkali metals, oxidizing agents, hydroxides, amines, carbonates, cyanides, sulfides, sulfites, formaldehyde.

Hazardous decomposition products: Hydrogen, chlorine.

Section 11 Toxicological Information

Effects of overexposure: Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. Vapors are irritating and may cause damage to the eyes. Splashes may cause severe burns and permanent eye damage. Can cause redness, pain, and severe skin burns. Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract.

RTECS #: MW4025000 [Hydrochloric acid]

Section 12 Ecological Information

The methods for determining the biological degradability are not applicable to inorganic substances. Harmful ecological effects due to the pH shift are expected.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: UN1789
Shipping name: Hydrochloric acid
Hazard class: 8
Packing group: II
Exceptions: Ltd Qty • 1 Lt.

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-595-7), RCRA code D002.

Section 16 Additional Information

MATERIAL SAFETY DATA SHEET

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MSDS No.: HH0180
Revision Date: April 1, 2008
Approved by: James A. Bertsch

MSDS No.: HH0180

Section 1 Chemical Product and Company Information

Product	**HYDROGEN PEROXIDE, 3%**
Synonyms	Hydrogen peroxide aqueous solution, stabilized

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units (ACGIH 2001)
Hydrogen peroxide	7722-84-1	3%	TWA: 1 ppm
Water	7732-18-5	97%	None established.
Acetanilide	103-84-4	0.05%	None established.

Section 3 Hazards Identification

Emergency Overview

CAUTION!
IRRITANT. MAY CAUSE IRRITATION TO SKIN AND EYES ON CONTACT.
Avoid contact with skin, eyes and clothing. Avoid contamination from any source.
Do not alter or tamper with venting mechanism.
Target organs: None known.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	0
Fire	0
Reactivity	1
Contact	1

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool. Use water only to fight fires in which this material is involved. Apply vast amounts for cooling and dilution. This product is a strong oxidizer which may release oxygen and promote the combustion of flammable materials. Spontaneous combustion can occur if allowed to remain in contact with oxidizable materials. Drying of product on clothing or combustible material may cause fire. Do not allow temperature of storage to rise above 100°F.

Extinguishing Media: Use media suitable for extinguishing supporting fire.

Flash Point: N/A

Autoignition temperature: N/A

Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Dilute with water and absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage — GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale vapors, spray or mist. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: Use a chemical fume hood and/or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical & Chemical Properties

Physical state: Liquid.
Appearance: Clear, colorless.
Odor: Slightly pungent odor.
pH: N/A
Vapor pressure (mm Hg): 14 (water)
Vapor Density (Air = 1): 0.7 (water)
Evaporation rate (Butyl acetate = 1): < 1
Viscosity: N/A
Boiling point: ~100°C (212°F) (water)
Freezing / Melting point: ~0°C (32°F) (water)
Decomposition temperature: N/A
Solubility: Complete.
Specific gravity (H_2O = 1): ~1.0
Percent volatile (%): 100%
Molecular formula: Mixture.
Molecular weight: Mixture.

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition. Contact with combustible materials may result in spontaneous combustion.

Incompatibilities with other materials: Acids, bases, metals, metal salts, reducing agents, organic materials, alkalies,dust and dirt contaminants, flammable substances, oxidizable materials.

Hazardous decomposition products: Oxygen, which will promote the combustion of flammable material.

Section 11 Toxicological Information

Effects of overexposure: EYES: Expected to cause irritation and/or burns. Could cause corneal damage which may occur several days later. SKIN: Expected to cause irritation and/or burns. As the concentration or time of exposure increases, the extent of damage increases. INHALATION: Expected to be irritating to respiratory tract. INGESTION: Expected to cause burns to the gastrointestinal tract. Medical conditions which may be aggravated by exposure include conjunctivitis of the eye, dermatitis of the skin, asthma and respiratory diseases.

ORL-RAT LD50: 800 mg/kg (50% hydrogen peroxide)

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: Not Regulated.
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-765-0), RCRA code D001, D002.

Section 16 Additional Information

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MATERIAL SAFETY DATA SHEET

MSDS No.: IX0160
Revision Date: April 1, 2008
Approved by: James A. Bertsch

MSDS No.: IX0160

Section 1 Chemical Product and Company Information

Product	**IODINE POTASSIUM IODIDE SOLUTION**
Synonyms	Iodine-Iodide Solution; Lugol's Dilute; Starch Test; Grams Iodine Stain

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Iodine	7553-56-2	1.85%	STEL: C 0.1 ppm
Potassium iodide	7681-11-0	3.05%	None established.
Water	7732-18-5	95.1%	None established. (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

WARNING! CORROSIVE!
HARMFUL IF INHALED OR SWALLOWED. CAUSES BURNS TO SKIN AND EYES. Avoid contact with skin, eyes and mucous membranes.
When heated, produces iodine vapor.
Target organs: None known.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	3
Fire	0
Reactivity	1
Contact	2

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use flooding amounts of water during early stages of fire. When heated, emits violet colored fumes of iodine which are toxic and corrosive to metals and all body tissues.

Extinguishing Media: Carbon dioxide, dry chemical, water spray, alcohol foam.

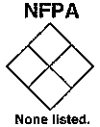
Flash Point: N/A

Autoignition temperature: N/A

Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe



None listed.

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation. Recover for use if not contaminated. Absorb with inert dry material, sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage — CORROSIVE STORAGE CODE WHITE

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale vapors, spray or mist. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: Use a chemical fume hood and/or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical & Chemical Properties

Physical state: Liquid.
Appearance: Deep, amber color.
Odor: Iodine odor.
pH: N/A
Vapor pressure (mm Hg): 14 (water)
Vapor Density (Air = 1): 0.7 (water)
Evaporation rate (Butyl acetate = 1): < 1
Viscosity: N/A
Boiling point: ~100°C (212°F) (water)
Freezing / Melting point: ~0°C (~32°F) (water)
Decomposition temperature: N/A
Solubility: Complete.
Specific gravity (H_2O = 1): 1.0 (water)
Percent volatile (%): 95.1%
Molecular formula: Mixture.
Molecular weight: Mixture.

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures and heat to cause evaporation.

Incompatibilities with other materials: Contact of gaseous ammonia or its solutions with free iodine should be avoided to prevent the formation of the explosive "nitrogen iodide". Acetaldehyde, sodium azide, sodium hydride.

Hazardous decomposition products: Free iodine.

Section 11 Toxicological Information

Effects of overexposure: Contact as fumes or solution is intensely irritating to eyes, skin and mucous membranes. May cause delayed lung injury. Ingestion of large quantities of this material causes abdominal pain, vomiting and diarrhea. In severe cases, purging, excessive thirst and circulatory failure may develop.

ORL-HUM LD50: 2-4 gm as iodine
IHL-RAT LC50: N/A
SKN-RBT LD50: N/A

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

None listed.

Section 16 Additional Information

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MATERIAL SAFETY DATA SHEET

MSDS No.: IX0210
Revision Date: April 24, 2008
Approved by: James A. Bertsch

MSDS No.: IX0210

Section 1 Chemical Product and Company Information

Product	**IRON METAL FILINGS, DEGREASED, 40-60 MESH**
Synonyms	Iron Aggregate

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Iron aggregate	65997-19-5	100%	
Contains:			
Iron	1309-37-1	>90%	TWA: 5 mg/m^3
Carbon	7440-44-0	<4.0%	N/A
Silicon	7440-21-3	<3.0%	TWA: 10 mg/m^3
Manganese	7439-96-5	<0.3-1.0%	TWA: 0.2 mg/m^3
Chromium	7440-47-3	<0.0-0.2%	TWA: 0.5 mg/m^3 (metal and Cr III compounds) (ACGIH 2001)

Section 3 Hazards Identification

Emergency Overview

CAUTION!
Iron dust dispersed in air may constitute a fire and/or explosion hazard.
Iron dust may cause irritation and/or inflammation of the skin, eyes, mucous membranes and lungs.
Target organs: None known.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	1
Fire	0
Reactivity	1
Contact	1

HMIS *

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool. A fire hazard in the form of a fine dust dispersed in air or by chemical reaction with strong oxidizers can be an explosion hazard, especially when heated.

Extinguishing Media: Use dry chemical, dry sand or graphite for extinguishing fire.
Flash Point: N/A
Autoignition temperature: N/A
Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

None listed.

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage — GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale dust. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Section 9 Physical & Chemical Properties

Physical state: Solid.
Appearance: Grey particles.
Odor: No odor.
pH: N/A
Vapor pressure (mm Hg): N/A
Vapor Density (Air = 1): N/A
Evaporation rate (Butyl acetate = 1): N/A
Viscosity: N/A
Boiling point: N/A
Freezing / Melting point: 1508.49°C (2750°F)
Decomposition temperature: N/A
Solubility: Insoluble.
Specific gravity (H_2O = 1): 6.7 gm/cc
Percent volatile (%): N/A
Molecular formula: Mixture.
Molecular weight: Mixture.

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition. Acids.
Incompatibilities with other materials: Strong oxidizers, organic acids, mineral acids, water.
Hazardous decomposition products: None.

Section 11 Toxicological Information

Effects of overexposure: Iron dust is an eye, skin and mucous membrane irritant. May cause irritation and inflammation of the eyes and lungs. Exercise appropriate procedures to minimize potential hazards.

ORL-RAT LD50: 30 gm/kg

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-096-4), RCRA code D001, Ca Prop 65-Not listed.

Section 16 Additional Information

MATERIAL SAFETY DATA SHEET

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1.877.LEARN76

MSDS No.: IX0230
Effective Date: January 11, 2007

SECTION I NAME

Product	Isopropyl Alcohol, 70% Solution
Chemical Synonyms	Isopropanol, Water Solution
Formula	Mixture.
Unit Size	up to 20 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA: 3 (top), 1 (left), 0 (right)

HMIS *	
Health	1
Fire	3
Reactivity	1

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Isopropyl alcohol: CAS No. 67-63-0	70%	TWA: 400 ppm STEL: 500 ppm
Water: CAS No. 7732-18-5	30%	None established.
WARNING! FLAMMABLE!		
HARMFUL IF SWALLOWED. CAUSES EYE IRRITATION.		

SECTION III PHYSICAL DATA

Melting Point (°F)	Approx. -50°C (-58°F)	Specific Gravity (H_2O = 1)	Approx. 0.8
Boiling Point (°F)	85° - 100°C (185 - 212°F)	Percent Volatile by Volume (%)	100%
Vapor Pressure (mm Hg)	33 mm @ 20°C (Pure IPA)	Evaporation Rate (n-Butyl acetate =1)	> 1
Vapor Density (Air=1)	2.1 (Pure IPA)		
Solubility in Water	Complete.		
Appearance & Odor	Clear, colorless liquid; mild alcohol odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume	Lower	Upper
21.7°C (71°F) TCC (for 70%)	Pure IPA	2%	12%

Extinguisher Media: "Alcohol foam", carbon dioxide, dry chemical, water spray.

SPECIAL FIREFIGHTING PROCEDURES

If involved in fire situation, wear a NIOSH/MSHA-approved self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Use flooding amounts of water in early stages of fire.

Autoignition Temperature: 399°C (750°F) (ASTM-E659-78) (Pure IPA).
Cool Flame: 360°C (680°F) (ASTM-E659-78) (Pure IPA).

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 129)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors, or ignition sources at locations distant from material handling point. **CAUTION!** Flame may not be visible in daylight. Fire or excessive heat may produce hazardous decomposition products; can react vigorously with oxidizing materials.

D.O.T. UN1219, Isopropanol, 3, PG II, Ltd Qty • 1 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA IX0230

Threshold Limited Value: None established for 70% Isopropyl alcohol. For Isopropanol: TWA 400 ppm STEL: 500 ppm ACGIH 2001. Human, oral LDLo: 2371 mg/kg. Rabbit, skin LD50: 16 mg/kg.

Effects of Overexposure: **INGESTION:** 100 mL can be fatal. Aspiration hazard. **EYES:** Liquid may cause irritation. **SKIN:** Prolonged or repeated contact may cause irritation and drying, cracking and defatting of the skin. **INHALATION:** Exposure to high concentrations (>400 ppm) may cause eye, nose and throat irritation and excessively high concentrations may cause narcosis (drowsiness, sleepiness). Target organs: Central nervous sytem, liver, kidneys.

Emergency and First Aid Procedures: **INGESTION:** Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Excessive temperature, heat, sparks or flame.
	Stable	X	

Incompatibility (Materials to Avoid): Strong oxidizing materials, caustics, chlorinated compounds can react vigorously with this alcohol. Aluminum, metal, nitroform, oleum.

Hazardous Decomposition Products: Thermal decomposition or burning will produce carbon dioxide and/or carbon monoxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Remove all ignition sources. Provide adequate ventilation. This material is handled and disposed of as a flammable liquid. Absorb small spills on paper; evaporate isopropyl alcohol in an exhaust hood; burn paper after evaporation. Prevent flow to sewers and public water ways.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved incinerator equipped with an afterburner and scrubber.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None should be needed in normal laboratory use at room temperature. If misty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved respirator.

Ventilation				
	Local Exhaust	None needed.	Special	No.
	Mechanical (General)	None needed.	Other	No.

Protective Gloves		Eye Protection	
	Rubber.		Chemical safety goggles.

Other Protective Equipment: Lab coat, eye wash station, fire extinguisher, proper gloves, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Store in a cool place away from oxidizing materials and fire hazards. Wash thoroughly after handling.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with skin and eyes. Avoid prolonged or repeated breathing of vapors. Use with adequate ventilation. Keep away from heat, sparks and flame. Keep container tightly closed when not in use. Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
9	01/11/07	James A. Bertsch	JAB

MATERIAL SAFETY DATA SHEET

LabLearner™ The Science of Learning
Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: MM0021
Effective Date: April 24, 2007

SECTION I NAME

Product	Magnesium Metal, Coated
Chemical Synonyms	Magnesium
Formula	Mg
Unit Size	up to 2.5 Kg.
C.A.S. No.	7439-95-4

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA: 1 (top), 0 (left), 1 (right)

HMIS *	
Health	1
Fire	4
Reactivity	3

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Magnesium metal *	> 98%	See Section V.
Proprietary fire retardant		

DANGER! FLAMMABLE SOLID! DANGEROUS WHEN WET!

MOISTURE SENSITIVE. SEVERE EXPLOSION HAZARD IF DUST IS SUSPENDED IN AIR.

SECTION III PHYSICAL DATA

Melting Point (°F)	1205°F (651°C)	Specific Gravity (H_2O = 1)	~ 55 lb/ft^3
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	Negligible.		
Appearance & Odor	White coated, metallic powder; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	N/A	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		

Extinguisher Media: Smother with dry graphite, talc, dry sand. **DO NOT USE WATER.** Do **NOT** use foam, halogenated extinguishing agents, or carbon dioxide.

SPECIAL FIREFIGHTING PROCEDURES

Manual application of water should be not be used. Use of water on molten or burning magnesium will produce hydrogen gas on contact and may cause explosion. Protect eyes and skin against flying particles. Avoid direct viewing of magnesium fires as eye injury may result. Wear fire glasses when viewing magnesium flame. Firefighters should wear a NIOSH/MSHA-approved self-contained breathing apparatus and protective clothing when appropriate.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 138)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Easily ignited and burns with intense heat and brilliant white flame. Powders may form explosive mixtures with air which may be ignited by a spark. In finely divided form, will react with water and acids to release hydrogen; also hazardous in such form with chlorine, bromide, iodine, oxidizing agents and acids.

* May contain either aluminum oxide and/or magnesium oxide.

D.O.T. Magnesium, granules, coated, 4.3, UN2950, PG III, Ltd Qty - 1 Kg.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA MM0021

Threshold Limited Value: None established. (ACGIH 2001). Magnesium Oxide Fume: ACGIH TLV (1984) 10 mg/m^3 (TWA): OSHA PEL 15 mg/m^3 (TWA).

Effects of Overexposure

Metallic magnesium particles which gain entry through cuts and scratches may produce a severe local lesion with evolution of hydrogen gas and acute inflammatory reaction. Refractory material may cause burns to eyes, throat, etc. Causes redness and/or burning sensation on skin, in eyes, throat, etc. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Dangerous when wet. Avoid exposure to moisture, heat, sparks and flame.
	Stable	X		

Incompatibility (Materials to Avoid): Magnesium will react with water and acids to release hydrogen; also hazardous with chlorine, bromine, iodine, oxidizing agents and acids.

Hazardous Decomposition Products: Hydrogen will be produced - when exposed for long time to water and acids.

Hazardous Polymerization		Conditions to Avoid
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Avoid dusting. Use non-sparking tools. Clean dry powder may be swept gently to avoid dusting and placed in clean drums and sealed. Wet or contaminated material should be placed in vented containers and moved to a remote area for disposal by burning.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved incinerator or in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None needed in normal laboratory handling. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation	Local Exhaust	If dusty.	Special	No.
	Mechanical (General)	If dusty.	Other	No.

Protective Gloves: Fire-resistant. **Eye Protection**: Chemical safety glasses, fire glasses.

Other Protective Equipment: Wear appropriate fire resistant clothing (e.g., gloves, coveralls, etc.) when exposing magnesium metal to elevated temperatures (950°F) which can cause ignition. Goggles.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store at room temperature in a dry place away from other combustibles in a metal cabinet. Avoid direct viewing of magnesium fires as eye injury may result. Ground all handling and transferring operations.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Keep away from sparks, open flame, acid and dampness. Wet, moist or high humidity storage conditions will lead to corrosion of the product. Constant clean-up and good housekeeping.

Revision No. 1	Date 04/24/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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240 North Third Street - Suite 1300
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www.LabLearner.com
1.877.LEARN78

MSDS No.: MM0010 MM0022
Effective Date: January 12, 2007

SECTION I NAME

Product	Magnesium Metal, Ribbon, Chips, Turnings
Chemical Synonyms	Magnesium Metal
Formula	Mg
Unit Size	up to 2.5 Kg.
C.A.S. No.	7439-95-4

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA: 1 (top), 0 (left), 1 (right)

HMIS *	
Health	0
Fire	2
Reactivity	2

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Magnesium metal	99.8%	See Section V.
DANGER! FLAMMABLE SOLID!		
DANGEROUS WHEN WET. KEEP AWAY FROM ALL IGNITION SOURCES.		

SECTION III PHYSICAL DATA

Melting Point (°F)	1202°F (651°C)	Specific Gravity (H_2O = 1)	1.74 at 20°C
Boiling Point (°F)	2030°F (1110°C)	Percent Volatile by Volume (%)	Non-volatile.
Vapor Pressure (mm Hg)	1 mm at 621°C	Evaporation Rate (n-Butyl acetate =1)	Non-volatile.
Vapor Density (Air=1)	Data not listed.		
Solubility in Water	Negligible (Decomposes-reacts with water to yield magnesium oxide.)		
Appearance & Odor	Silvery gray metal ribbon, chips, turnings; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	1175°F (636°C)	Flammable Limits in Air % by Volume N/A	Lower	Upper
Extinguisher Media	**DO NOT USE WATER.** Do **NOT** use foam, halogenated extinguishing agents, or carbon dioxide. Smother with dry graphite, talc, dry sand, G-1 powder, purple K.			

SPECIAL FIREFIGHTING PROCEDURES

Do not use foam, carbon tetrachloride, or carbon dioxide. Manual application of water should be conducted with care to prevent contact with burning or molten magnesium. Protect eyes and skin against flying particles. Avoid direct viewing of magnesium fires as eye injury may result. Firefighters should wear a NIOSH/MSHA-approved self-contained breathing apparatus and protective clothing when appropriate. Wear fire glasses when viewing magnesium flame.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 138)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Combustible metal. Easily ignited and burns with intense heat and brilliant white flame. Powders form explosive mixtures with air which may be ignited by a spark. In finely divided form, will react with water and acids to release hydrogen; also hazardous in such form with chlorine, bromide, iodine, oxidizing agents and acids.

Autoignition Temperature: 510°C (950°F).

D.O.T. **Magnesium, 4.1, UN1869, PG III, Ltd Qty - 5 Kg.**

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA MM0022

Threshold Limited Value

None established. (ACGIH 2001). Magnesium Oxide Fume: ACGIH TLV (1984) 10 mg/m^3 (TWA): OSHA PEL 15 mg/m^3 (TWA).

Effects of Overexposure

Exposure to magnesium metal or oxide dust should be a low health risk by inhalation and should be treated as a nuisance dust. Exposure to magnesium oxide fume subsequent to burning can result in metal fume fever. The temporary symptoms can include fever, chills, nausea, vomiting and muscular pain. Onset of symptoms occurs 4-12 hours after exposure. **EYES:** May cause burns and corneal abrasions. **SKIN:** Particles of magnesium embedded in the skin may produce lesions that resist healing. **INGESTION:** No problem because of physical properties. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**
	Stable	X	Dangerous when wet. Avoid exposure to moisture, heat, sparks and flame.

Incompatibility (Materials to Avoid)

Magnesium will react with water and acids to release hydrogen; also hazardous with chlorine, bromine, iodine, oxidizing agents and acids.

Hazardous Decomposition Products

Hydrogen will be produced - when exposed for long time to water and acids.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	
	X	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Recover for use if not contaminated. Do not use water to clean up spill. Use appropriate safety equipment - clean up using non-sparking tools no smoking or open flames in the area. Avoid dusting. Clean dry product may be returned to dry container and sealed against moisture or place in a suitable container for disposal. Wet or contaminated material should be placed in vented containers and moved to a remote area for disposal by burning.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved incinerator or in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type)	None needed in normal laboratory handling. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.			
Ventilation	Local Exhaust	If dusty.	Special	No.
	Mechanical (General)	If dusty.	Other	No.
Protective Gloves	Fire-resistant.	**Eye Protection**	Chemical safety goggles.	
Other Protective Equipment	Wear appropriate fire resistant clothing (e.g. , gloves, coveralls, etc.) when exposing magnesium metal to elevated temperatures (950°F) which can cause ignition.			

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store at room temperature in a dry place away from other combustibles in a metal cabinet. Avoid direct viewing of magnesium fires as eye injury may result. Ground all handling and transferring operations.

Other Precautions

Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Wet, moist or high humidity storage conditions will lead to corrosion of the product. Constant clean-up and good housekeeping.

Revision No. 11	Date 01/12/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN7B

MSDS No.: PP0174
Effective Date: January 1, 2007

SECTION I NAME

Product	Phenol Red, 0.04% Aqueous Solution
Chemical Synonyms	Phenol Red, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Phenol red, sodium salt: (CAS No. 34487-61-1)	0.04%	None established.
Water: (CAS No. 7732-18-5)	99.98%	None established.
CAUTION!		

MAY BE HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN. MAY CAUSE IRRITATION.

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes approx. 0°C (32°F)	Specific Gravity (H_2O = 1)	Approx. 1.00 @ 20°C.
Boiling Point (°F)	Approx. 100°C (212°F)	Percent Volatile by Volume (%)	99.96%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	< 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Red liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as dust or fume.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA PP0174

Threshold Limited Value

None established by ACGIH 2001.

Effects of Overexposure

May be harmful by ingestion or skin absorption. May cause irritation. To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated. Exercise appropriate procedures to minimize potential hazards. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		Conditions to Avoid
	Stable	X	Excessive temperature and heat.

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Combustion may produce carbon and sulfur oxides and sodium oxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Absorb with an inert dry material, sweep up and place in a suitable waste container for disposal. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None required in normal laboratory handling. If misty conditions prevail, wear a NIOSH/MSHA approved respirator.

Ventilation	Local Exhaust	Not required.	Special	No.
	Mechanical (General)	Not required.	Other	No.
Protective Gloves	Rubber.		Eye Protection	Chemical safety glasses.
Other Protective Equipment	Goggles, smock, apron, proper gloves, eye wash station.			

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Store in a cool, dry place. Wash thoroughly after handling.

Keep container tightly closed when not in use.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
1	01/01/07	James A. Bertsch	JAB

MATERIAL SAFETY DATA SHEET

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Cognitive Learning Systems
240 North Third Street - Suite 1300
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MSDS No.: SS0151
Effective Date: January 1, 2007

SECTION I NAME

Product	Silicon Metal Lumps
Chemical Synonyms	Silicon Metal
Formula	Si
Unit Size	up to 500 grams
C.A.S. No.	7440-21-3

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA

Health	0
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Silicon metal lumps	100%	See Section V.
CAUTION!		
IRRITANT AS DUST. DO NOT INHALE AS DUST OR FUME.		

SECTION III PHYSICAL DATA

Melting Point (°F)	1440°C (2594°F)	Specific Gravity (H_2O = 1)	2.3
Boiling Point (°F)	N/A	Percent Volatile by Volume (%)	N/A
Vapor Pressure (mm Hg)	N/A	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	Insoluble.		
Appearance & Odor	Metallic silver lumps; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

None known. In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS0151

Threshold Limited Value

ACGIH 2001 (TLV): TWA = 10 mg/m^3, for total dust containing no asbestos and less than 1% crystalline silica; STEL 20 mg/m^3 (Dust).

Effects of Overexposure

Inhalation of dust may cause irritation to lungs, eyes and mucous membranes. Low hazard in the form of lumps. Exercise appropriate procedures to minimize potential hazards. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**	Avoid generation of airborne dust.
	Stable	X		

Incompatibility (Materials to Avoid) Acids and strong bases (avoid resulting fumes).

Hazardous Decomposition Products None.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Recover for use if not contaminated. Avoid creating dust. Sweep up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Uncontaminated material may be disposed of in a sanitary landfill. Check local codes.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None needed in normal laboratory handling. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask or respirator.

Ventilation	Local Exhaust	Recommended.	Special	No.
	Mechanical (General)	Recommended.	Other	No.

Protective Gloves Rubber. **Eye Protection** Chemical safety glasses.

Other Protective Equipment Lab coat, apron, eye wash station, proper gloves, ventilation hood.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool place. Avoid inhalation of silicon dust. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Remove and wash contaminated clothing.

Revision No. 4	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

LabLearner
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240 North Third Street · Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: SS0187
Effective Date: August 3, 2007

SECTION I NAME

Product	Silver Nitrate, 0.2 Molar Solution
Chemical Synonyms	Silver Nitrate, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	2
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Silver nitrate: (CAS No. 7761-88-8)	3.4%	See Section V.
Water: (CAS No. 7732-18-5)	96.6%	None established.

CAUTION! MAY BE HARMFUL IF SWALLOWED. IRRITANT TO SKIN, EYES AND MUCOUS MEMBRANES.

SECTION III PHYSICAL DATA

Melting Point (°F)	Freezes approx. 0°C (32°F)	Specific Gravity ($H_2O = 1$)	1.0-1.1 at 20°C
Boiling Point (°F)	Approx. 100°C (212°F)	Percent Volatile by Volume (%)	96.6%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	< 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Clear, colorless liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-combustible.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

Wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes. Use flooding amounts of water in early stages of fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as dust and fumes.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS0187

Threshold Limited Value

None established for this solution. (ACGIH 2001) TWA: 0.01 mg/m³ as silver metal as soluble compounds 0.1 mg/m³ as silver metal.

Effects of Overexposure

CONTACT: May cause burns to skin, eyes and mucous membranes. Discolors skin on contact. **INGESTION:** May be harmful if swallowed. Exercise appropriate procedures to minimize potential hazards. Target organs: Liver, kidneys.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**	Excessive temperature to cause evaporation. Protect from light.
	Stable	X		

Incompatibility (Materials to Avoid) When dry, reducing materials; charcoal, ammonium hydroxide, alcohol and organic materials can cause a reaction.

Hazardous Decomposition Products Thermal decomposition produces metallic silver, nitrogen, oxygen and oxides of nitrogen.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Absorb in vermiculite, sand, earth or paper towel. Scoop up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved chemical landfill or contract an approved and licensed disposal agency.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None needed in normal laboratory handling. If misty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved respirator.

Ventilation	Local Exhaust	Not required.	Special	No.
	Mechanical (General)	Not required.	Other	No.

Protective Gloves Rubber. **Eye Protection** Chemical safety glasses.

Other Protective Equipment Goggles, smock, apron, proper gloves and eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool place and protect from light. Do not store near combustible material. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid breathing mist. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing.

Revision No. 1	Date 08/03/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN78

MSDS No.: SS0430
Effective Date: February 13, 2008

SECTION I NAME

Product	Sodium Chloride
Chemical Synonyms	Common Salt; Rock Salt
Formula	NaCl
Unit Size	up to 180 Kg.
C.A.S. No.	7647-14-5

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	1
Fire	0
Reactivity	0

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Sodium chloride	100%	None established.
LOW HAZARD FOR USUAL LABORATORY HANDLING; NON-TOXIC.		

SECTION III PHYSICAL DATA

Melting Point (°F)	804°C (1479°F)	Specific Gravity (H_2O = 1)	2.163 at 25°C
Boiling Point (°F)	1413°C (2575°F)	Percent Volatile by Volume (%)	Negligible as solid.
Vapor Pressure (mm Hg)	1 mm at 865°C (1589°F)	Evaporation Rate (=1)	Non-volatile.
Vapor Density (Air=1)	Not listed.		
Solubility in Water	1 gram dissolves in 2.8 mL. water at 25°C.		
Appearance & Odor	White crystals, granular or powder; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A	-------	-------
Extinguisher Media	Use any media suitable for extinguishing supporting fire.			

SPECIAL FIREFIGHTING PROCEDURES

Salt is non-flammable. This section does not apply. In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and eye protection.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When sodium chloride is heated to high temperatures, a vapor is emitted which is irritating to the eyes, particularly.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS0430

Threshold Limited Value

None established. RTECS No. VZ4725000 Toxicity data: LD50 Orl-rat 3000 mg/kg. No published data indicating salt is a hazardous material to handle.

Effects of Overexposure

EYES AND SKIN: Considered as mild irritant. Gross overexposure, over a long period of time, results in dehydration. **INGESTION:** Of large amounts (more than 0.1 pound) may cause vomiting. **INHALATION:** Dust leaves taste with mild irritation to mucous membrane in nose and throat. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Wet conditions can cause caking and/or corrosion.
	Stable	X		

Incompatibility (Materials to Avoid) Electrolysis can produce chlorine gas. None - provided the salt is dry. Concentrated acid such as sulfuric and nitric.

Hazardous Decomposition Products Electrolysis can produce chlorine gas.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Sweep up and place in a suitable container. Sweep up and flush with water. No special hazards connected with leaks or spills.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dry landfill or dissolve in sufficient amounts of water to meet existing water quality standards.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None should be needed in normal laboratory use. If dusty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Ventilation	**Local Exhaust**	Yes, if dusty.	**Special**	No.
	Mechanical (General)	Yes, if dusty.	**Other**	No.

Protective Gloves	None needed.	**Eye Protection**	Chemical safety glasses.

Other Protective Equipment Lab coat, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a dry place with relative humidity below 75% to prevent deliquescence. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Gloves are usually not necessary unless open skin is present.

Revision No. 8	Date 02/13/08	Approved James A. Bertsch	Chemical Safety Coordinator JAB

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1.877.LEARN76

MATERIAL SAFETY DATA SHEET

MSDS No. SS0578
Effective Date August 25, 2008

SECTION I NAME

Product	Sodium Hydroxide, 0.005 Molar Solution (0.005N)
Chemical Synonyms	Sodium Hydroxide, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 716-226-6177

NFPA

Health	2
Fire	0
Reactivity	1

HMIS *

HAZARD RATING
MINIMAL 0 SLIGHT 1 MODERATE 2 SERIOUS 3 SEVERE 4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Sodium hydroxide: CAS No. 1310-73-2	0.02%	TWA: C 2 mg/m^3
Water: CAS No. 7732-18-5	99.98%	N/A
DANGER! CORROSIVE!		

HARMFUL IF SWALLOWED. CAUSES BURNS TO SKIN AND EYES. DO NOT INHALE AS DUST OR MIST.

SECTION III PHYSICAL DATA

Melting Point (°F)	0°C (32°F)	Specific Gravity (H_2O = 1)	~ 1.1
Boiling Point (°F)	~ 100°C (212°F)	Percent Volatile by Volume (%)	99.98%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (=1)	< 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Clear, colorless liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		N/A		
Extinguisher Media	Use water spray on fire involving this material.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing. Must include complete eye protection. Flood with water, using care not to splatter or splash this material.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 154)

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as dust or fume. Contact with most metals can generate hydrogen gas. A severe eye hazard; solid or concentrated solution destroys tissue on contact.

D.O.T. Sodium hydroxide solution, 8, UN1824, PG II, Ltd Qty - 1 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA

SS0578

Threshold Limited Value

None established for this solution. (ACGIH 2001)

Effects of Overexposure

INGESTION: Severe burns and complete tissue perforation of mucous membranes of the mouth, throat and stomach. **SKIN AND EYES:** Contact with skin or eyes may cause severe irritation or burns. **INHALATION:** Exposure can produce burns of the respiratory tract. Severe exposure could result in chemical pneumonia. Target organs: Respiratory and gastrointestinal tracts, eyes, skin.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Deliquescent material. Can slowly pick up moisture from air and react with carbon dioxide to form sodium carbonate.
	Stable	X		

Incompatibility (Materials to Avoid) Metals, acids, organic halogen compounds, organic nitro compounds.

Hazardous Decomposition Products Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Wearing protective clothing, absorb spill with an inert dry material, sweep up and place in a suitable container for disposal. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with all federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None required in normal laboratory handling. If misty conditions prevail, use a high efficiency particulate respirator.

Ventilation	**Local Exhaust**	Recommended.	**Special**	No.
	Mechanical (General)	Recommended.	**Other**	No.
Protective Gloves	Rubber.	**Eye Protection**	Chemical safety goggles, or face shield where appropriate.	

Other Protective Equipment Goggles, lab coat, apron, ventilation hood, proper gloves, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry place. Product can react violently with acids and other substances. Avoid contact with skin, eyes and clothing. Do not take internally. Avoid inhalation of vapor or spray. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Sodium hydroxide and trichloroethylene are especially hazardous since they react to form spontaneously flammable dichloroacetylene. Wash contaminated clothing before reuse.

Revision No. 1	Date 08/25/08	Approved	James A. Bertsch	Chemical Safety Coordinator	JAB

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www.LabLearner.com
1.877.LEARN78

MATERIAL SAFETY DATA SHEET

MSDS No. SS0600
Effective Date January 1, 2007

SECTION I NAME

Product	Sodium Hydroxide, 0.1 Molar Solution (0.1N)
Chemical Synonyms	Sodium Hydroxide, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 716-226-6177

NFPA: 0 (top), 3 (left), 1 (right)

HMIS *	
Health	2
Fire	0
Reactivity	1

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Sodium hydroxide: CAS No. 1310-73-2	0.4%	TWA: C 2 mg/m^3
Water: CAS No. 7732-18-5	99.6%	N/A
DANGER! CORROSIVE!		

HARMFUL IF SWALLOWED. CAUSES BURNS TO SKIN AND EYES. DO NOT INHALE AS DUST OR MIST.

SECTION III PHYSICAL DATA

Melting Point (°F)	0°C (32°F)	Specific Gravity (H_2O = 1)	~1.1
Boiling Point (°F)	~100°C (212°F)	Percent Volatile by Volume (%)	99.6%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (=1)	<1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Clear, colorless liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume N/A	Lower	Upper
Extinguisher Media	Use water spray on fire involving this material.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing. Must include complete eye protection. Flood with water, using care not to splatter or splash this material.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 154)

UNUSUAL FIRE AND EXPLOSION HAZARDS

In fire conditions, water may evaporate from this solution, which may cause hazardous decomposition products to be produced as dust or fume. Contact with most metals can generate hydrogen gas. A severe eye hazard; solid or concentrated solution destroys tissue on contact.

D.O.T. Sodium hydroxide solution, 8, UN1824, PG II, Ltd Qty - 1 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS0600

Threshold Limited Value

None established for this solution. (ACGIH 2001)

Effects of Overexposure

INGESTION: Severe burns and complete tissue perforation of mucous membranes of the mouth, throat and stomach. **SKIN AND EYES:** Contact with skin or eyes may cause severe irritation or burns. **INHALATION:** Exposure can produce burns of the respiratory tract. Severe exposure could result in chemical pneumonia. Target organs: Respiratory and gastrointestinal tracts, eyes, skin.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	**Unstable**		**Conditions to Avoid**	Deliquescent material. Can slowly pick up moisture from air and react with carbon dioxide to form sodium carbonate.
	Stable	X		

Incompatibility (Materials to Avoid) Metals, acids, organic halogen compounds, organic nitro compounds.

Hazardous Decomposition Products Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.

Hazardous Polymerization		**Conditions to Avoid**
May Occur	**Will Not Occur**	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Wearing protective clothing, absorb spill with an inert dry material, sweep up and place in a suitable container for disposal. Wash spill area with soap and water.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with all federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type) None required in normal laboratory handling. If misty conditions prevail, use a high efficiency particulate respirator.

Ventilation	**Local Exhaust**	Recommended.	**Special**	No.
	Mechanical (General)	Recommended.	**Other**	No.

Protective Gloves Rubber. **Eye Protection** Chemical safety goggles, or face shield where appropriate.

Other Protective Equipment Goggles, lab coat, apron, ventilation hood, proper gloves, eye wash station.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry place. Product can react violently with acids and other substances. Avoid contact with skin, eyes and clothing. Do not take internally. Avoid inhalation of vapor or spray. Wash thoroughly after handling.

Other Precautions Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Sodium hydroxide and trichloroethylene are especially hazardous since they react to form spontaneously flammable dichloroacetylene. Wash contaminated clothing before reuse.

Revision No. 8	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

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www.LabLearner.com
1.877.LEARN78

MSDS No.: SS1085 SS1090
Effective Date: January 1, 2007

SECTION I NAME

Product	Sulfur
Chemical Synonyms	Sulfur Flower, Sulfur Flour, Roll
Formula	S
Unit Size	up to 2.5 Kg.
C.A.S. No.	7704-34-9

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA: 1 / 1 / 0

HMIS *	
Health	1
Fire	1
Reactivity	0

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Sulfur	100%	See Section V.

WARNING! FLAMMABLE SOLID! BURNING SULFUR EMITS HIGHLY TOXIC FUMES. SULFUR DUST SUSPENDED IN AIR IGNITES EASILY. MAY CAUSE ALLERGIC REACTION.

SECTION III PHYSICAL DATA

Melting Point (°F)	116°-121°C (242°-251°F)	Specific Gravity (H_2O = 1)	2.04-2.07 @ 21°C (70°F)
Boiling Point (°F)	444°C (831°F)	Percent Volatile by Volume (%)	Negligible.
Vapor Pressure (mm Hg)	0 @ 138°C (280°F)	Evaporation Rate (=1)	N/A
Vapor Density (Air=1)	N/A		
Solubility in Water	Insoluble.		
Appearance & Odor	Yellow powder, crystals or rolls (broken lumps); Faint odor of rotten eggs.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Flammable Limits in Air % by Volume	Lower	Upper
207°C (405°F) (C.C.)		3.3	46.0

Extinguisher Media: Use water fog.

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a MIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Use water fog; avoid straight streams which will scatter molten sulfur and dust. Small fires may be extinguished with sand or additional sulfur. Fire can rekindle if not cooled below 154°C (310°F).

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 133)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Easily ignitible, combustible solid. Dust or vapor forms explosive mixtures with air. Hazardous in contact with oxidizing materials, forming explosive mixtures. Explosion Hazard: Moderate, in the form of dust, when exposed to flames. Dangerous when heated it emits highly toxic fumes of oxides of sulfur; can react with oxidizing materials.

Autoignition Temperature: 248°C (478°F).

D.O.T. Sulfur, 9, NA1350, PG III

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS1085

Threshold Limited Value

None established. TLV: 10 mg/m^3 (total dust) or 5 mg/m^3 (respirable dust).

Effects of Overexposure

Sulfur is essentially non-toxic either through ingestion, inhalation or skin contact. There are, however, some individuals who may be allergic and must not be permitted in the area of exposure. Sulfur is an eye irritant, but if prompt treatment is applied no lasting injury will result. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability			Conditions to Avoid
	Unstable		Heat, sparks, open flames and other heat sources.
	Stable	X	

Incompatibility (Materials to Avoid): Reacts violently with strong oxidizing agents. Corrosive to copper and copper alloys. Damp sulfur will corrode steel.

Hazardous Decomposition Products: Sulfur dioxide.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	Not applicable.
	X	

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Use non-sparking tools. Provide ventilation in spill area. Avoid creating dust in air and accumulation on surfaces from spills or laboratory operations. Sweep up and place in a suitable container for reclamation or disposal in an approved facility.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved sanitary landfill after mixing 3 parts by weight of calcium carbonate to neutralize the slow generation of sulfuric acid.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None should be needed in normal laboratory handling. If dusty conditions prevail, work in fume hood or wear a NIOSH/MSHA-approved respirator.

Ventilation				
Local Exhaust	Recommended.	Special	No.	
Mechanical (General)	Recommended.	Other	No.	

Protective Gloves	Rubber.	Eye Protection	Chemical safety glasses/goggles.

Other Protective Equipment: Smock, apron, eye wash station, vent hood, fire extinguisher.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry, well-ventilated area away from heat, sparks, flames and oxidizing agents. Avoid creating dust. All electric motors in sulfur working area should be of the explosive proof type. Wash thoroughly after handling.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Avoid contact with skin and eyes. Avoid breathing dust. Use with adequate ventilation. Use non-ferrous tools to reduce sparking. Remove and wash contaminated clothing before reuse.

Revision No. 11	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

LabLearner™ The Science of Learning
Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN76

MSDS No.: SS1121
Effective Date: January 1, 2007

SECTION I NAME

Product	Sulfuric Acid, 0.5 Molar (1.0N) Solution
Chemical Synonyms	Sulfuric Acid, Water Solution
Formula	Mixture.
Unit Size	up to 3.785 Lt.
C.A.S. No.	Mixture.

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC 800-424-9300
Day 585-226-6177

NFPA: 0 (top), 3 (left), 0 (right)

HMIS *	
Health	2
Fire	0
Reactivity	1

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Sulfuric acid: CAS No. 7664-93-9	2.62%	TWA:1 mg/m^3 STEL: 3 mg/m^3
Water: CAS No. 7732-18-5	97.38%	None established.
WARNING! CORROSIVE!		
HARMFUL IF SWALLOWED. MAY CAUSE BURNS.		

SECTION III PHYSICAL DATA

Melting Point (°F)	~ 0°C (32°F)	Specific Gravity (H_2O = 1)	~ 1.0
Boiling Point (°F)	~ 100°C (212°F)	Percent Volatile by Volume (%)	97.38%
Vapor Pressure (mm Hg)	14 (water)	Evaporation Rate (Water =1)	< 1
Vapor Density (Air=1)	0.7 (water)		
Solubility in Water	Complete.		
Appearance & Odor	Clear colorless liquid; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower: N/A	Upper: --------
Extinguisher Media	If involved in a fire, use water spray.			

SPECIAL FIREFIGHTING PROCEDURES

Wear a NIOSH/MSHA approved self-contained, positive pressure breathing apparatus, full firefighting protective clothing and eye protection.

(2004 EMERGENCY RESPONSE GUIDEBOOK, RSPA P 5800.9, GUIDE PAGE NO. 157)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Contact with reactive metals, e.g. aluminum may result in the generation of flammable hydrogen gas. Fire or excessive heat may produce hazardous decomposition products. May react vigorously with alkali materials.

D.O.T. Sulfuric acid, 8, UN2796, PG II, Ltd Qty - 1 Lt.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA SS1121

Threshold Limited Value: None established for this mixture. (ACGIH 2001)

Effects of Overexposure: Ingestion may cause irritation and/or burns to the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding and/or tissue ulceration. Contact with skin or eyes can cause severe irritation and/or burns. Repeated inhalation may cause irritation and/or burns to the nose, throat and lungs and also etching of dental enamel followed by the erosion of the enamel and dentine with loss of tooth substance. Exercise appropriate procedures to minimize potential hazards. Target organs: Respiratory system, skin, eyes, teeth.

Emergency and First Aid Procedures: **INGESTION:** Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**	Excessive temperature to cause evaporation.
	Stable	X		

Incompatibility (Materials to Avoid): Alkalies, amines, anhydrides, combustibles, organics, oxidizers, powdered metals.

Hazardous Decomposition Products: Thermal decomposition or combustion may produce sulfur trioxide and/or sulfur dioxide. Hydrogen gas by reaction with metals.

Hazardous Polymerization		Conditions to Avoid
May Occur	Will Not Occur	
	X	Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Carefully neutralize with soda ash or lime and cover with inert dry material and place in suitable container for disposal. Wash spill area with soap and water.

Waste Disposal Method: Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in accordance with federal, state and local regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type): None needed in normal laboratory handling. If misty conditions prevail, work in ventilation hood or wear a NIOSH/MSHA-approved respirator.

Ventilation				
Local Exhaust	Recommended.	Special	No.	
Mechanical (General)	Recommended.	Other	No.	

Protective Gloves: Rubber. **Eye Protection**: Chemical safety goggles.

Other Protective Equipment: Face shield, proper gloves, lab coat and apron, ventilation hood, emergency eye wash station and safety shower.

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing: Store in a cool, dry, well-ventilated area. Do not take internally. Avoid contact with skin, eyes and clothing.

Keep container tightly closed when not in use.

Other Precautions: Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Use with adequate ventilation. Remove and wash contaminated clothing.

Revision No. 9	Date 01/01/07	Approved James A. Bertsch	Chemical Safety Coordinator JAB

MATERIAL SAFETY DATA SHEET

LabLearner™
The Science of Learning
Cognitive Learning Systems
240 North Third Street - Suite 1300
Harrisburg, PA 17101
www.LabLearner.com
1.877.LEARN76

MSDS No.: ZZ0015
Effective Date: January 1, 2007

SECTION I NAME

Product	Zinc Metal
Chemical Synonyms	Mossy, Granular, Shot
Formula	Zn
Unit Size	up to 2.5 Kg.
C.A.S. No.	7440-66-6

24 HOUR EMERGENCY ASSISTANCE

CHEMTREC
800-424-9300
Day 585-226-6177

NFPA

Health	0
Fire	1
Reactivity	2

HMIS *

HAZARD RATING

MINIMAL	SLIGHT	MODERATE	SERIOUS	SEVERE
0	1	2	3	4

SECTION II INGREDIENTS OF MIXTURES

Principal Component(s)	%	TLV Units
Zinc metal	99%	None established.
CAUTION! USE CARE IN HANDLING - ABRASIVE TO SKIN.		

REACTS WITH ACIDS TO LIBERATE HYDROGEN GAS - A FLAMMABLE AND EXPLOSIVE GAS.

SECTION III PHYSICAL DATA

Melting Point (°F)	419°C (787°F)	Specific Gravity (H_2O = 1)	7.12
Boiling Point (°F)	907°C (1665°F)	Percent Volatile by Volume (%)	Not applicable.
Vapor Pressure (mm Hg)	Not applicable.	Evaporation Rate (=1)	Not applicable.
Vapor Density (Air=1)	Not applicable.		
Solubility in Water	Insoluble.		
Appearance & Odor	Silvery metal mossy, granular, shot; no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Non-flammable.	Flammable Limits in Air % by Volume	Lower	Upper
		Unknown		
Extinguisher Media	Smother with dry sand, earth or soda ash, dry powder. DO NOT USE WATER ON MOLTEN MATERIAL.			

SPECIAL FIREFIGHTING PROCEDURES

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus. When heated, the fumes are highly toxic, causing "fume fever".

UNUSUAL FIRE AND EXPLOSION HAZARDS

Bulk dust in contact with water or damp air evolves hydrogen. The heat produced during this reaction could ignite the hydrogen. An explosive condition may exist if this happens in confined spaces. Dust may form explosive mixture in air. Zinc oxide fume may result from combustion of Zinc dust.

D.O.T. NON-REGULATED.

Approved by U.S. Department of Labor "essentially similar" to form OSHA-20

SECTION V HEALTH HAZARD DATA ZZ0015

Threshold Limited Value

None established (ACGIH 2001).

Effects of Overexposure

INHALATION OF FUMES: When heated above 400°C, inhalation of the fumes may lead to metal fume fever. Mild to severe symptoms of chills and fever, profuse perspiration, weakness, nausea, vomiting and coughing can occur. **EYES:** May cause eye irritation. **SKIN:** Prolonged or repeated skin contact may cause skin irritation. Target organs: None known.

Emergency and First Aid Procedures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. **EYES:** Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention. **SKIN:** Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. **INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SECTION VI REACTIVITY DATA

Stability	Unstable		**Conditions to Avoid**	Excessive temperature and heat. Hydrogen may evolve when in contact with water or damp air.
	Stable	X		
Incompatibility (Materials to Avoid)	Strong oxidizers, acids, alkalies.			
Hazardous Decomposition Products	Oxides of zinc may be present. Zinc fumes.			
Hazardous Polymerization			**Conditions to Avoid**	
May Occur	**Will Not Occur**			
	X			Not applicable.

SECTION VII SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled

Recover for use if possible. Sweep or gather spill for reuse or place in a suitable container for disposal.

Waste Disposal Method

Discharge, treatment, or disposal may be subject to Federal, State or Local laws. These disposal guidelines are intended for the disposal of catalog-size quantities only.

Dispose of in an approved chemical landfill or contract with a licensed waste disposal service.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiration Protection (Specify Type)	None needed in normal laboratory handling. If dusty conditions prevail, wear a NIOSH/MSHA-approved dust mask or work ia adequate ventilation hood.				
Ventilation	Local Exhaust	Recommended.	Special	No.	
	Mechanical (General)	Recommended.	Other	No.	
Protective Gloves	Suitable to protect against skin irritation.	**Eye Protection**	Chemical safety glasses.		
Other Protective Equipment	Smock, apron, eye wash station, proper gloves, goggles, ventilation hood.				

SECTION IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling & Storing

Keep container tightly closed when not in use.

Store in a cool, dry, ventilated place. Separate from acids, halogenated hydrocarbons and strong alkali hydroxides.

Other Precautions

Read label on container before using. Do not wear contact lenses when working with chemicals. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.

Wash thoroughly after handling. Remove and wash contaminated clothing.

Revision No.	Date	Approved	Chemical Safety Coordinator
12	01/01/07	James A. Bertsch	JAB

SECTION 1: Identification of the substance/mixture and of the supplier

Product name: **Silicon, Metal, Powder**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **CLS10607**

Recommended uses of the product and restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific, Inc
9 Barnhart Drive, Hanover, PA 17331
(717) 632-1291

Supplier Details:

Cognitive Learning Systems
1604 N. 2nd Street, Ste. A Harrisburg, PA 17102
1-877-532-7678

Emergency telephone number:

Cognitive Learning Systems 1

SECTION 2: Hazards identification

Classification of the substance or mixture:

Flammable
Flammable liquids, category 2

Flammable solids (Category 2), H228.

Signal word: Danger

Hazard statements:
Flammable solid.

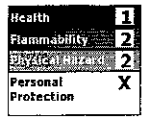
Precautionary statements:
If medical advice is needed, have product container or label at hand.
Keep out of reach of children.
Read label before use.
Do not eat, drink or smoke when using this product.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/light/equipment.
Wear protective gloves/protective clothing/eye protection/face protection.
In case of fire: Use agents recommended in section 5 for extinction.
Store in a well ventilated place. Keep container tightly closed.
May form combustible dust concentrations in air (during processing).

Other Non-GHS Classification:

WHMIS

NFPA/HMIS

NFPA SCALE (0-4)



HMIS RATINGS (0-4)

SECTION 3: Composition/information on ingredients

Ingredients:		
CAS 7440-21-3	Silicon	>99 %
		Percentages are by weight

SECTION 4: First aid measures

Description of first aid measures

After inhalation:

Loosen clothing as necessary and position individual in a comfortable position. Move exposed to fresh air. Give artificial respiration if necessary. If breathing is difficult give oxygen. Get medical assistance if cough or other symptoms appear.

After skin contact:

Rinse/flush exposed skin gently using soap and water for 15-20 minutes. Seek medical advice if discomfort or irritation persists.

After eye contact:

Protect unexposed eye. Rinse/flush exposed eye(s) gently using water for 15-20 minutes. Remove contact lens(es) if able to do so during rinsing. Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Seek medical attention if irritation, discomfort or vomiting persists. Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed:

Irritation. Nausea. Headache. Shortness of breath.

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician. Physician should treat symptomatically.

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition. Use water, dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam.

Unsuitable extinguishing agents: None

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors. Thermal decomposition can lead to release of irritating gases and vapors.

Advice for firefighters:

Protective equipment:

Use NIOSH-approved respiratory protection/breathing apparatus.

Additional information (precautions):

Move product containers away from fire or keep cool with water spray as a protective measure, where feasible. Use spark-proof tools and explosion-proof equipment. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Avoid inhaling gases, fumes, dust, mist, vapor, and aerosols. Avoid contact with skin, eyes, and clothing.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective equipment. Use spark-proof tools and explosion-proof equipment. Ensure that air-handling systems are operational. Ensure adequate ventilation.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13. Should not be released into environment.

Methods and material for containment and cleaning up:

Keep in suitable closed containers for disposal. Wear protective eyeware, gloves, and clothing. Refer to Section 8. Always obey local regulations. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Collect solids in powder form using vacuum with (HEPA filter). Evacuate personnel to safe areas.

Reference to other sections: None

SECTION 7: Handling and storage

Precautions for safe handling:

Minimize dust generation and accumulation. Follow good hygiene procedures when handling chemical materials. Refer to Section 8. Do not eat, drink, smoke, or use personal products when handling chemical substances. Avoid contact with eyes, skin, and clothing.

Conditions for safe storage, including any incompatibilities:

Store away from incompatible materials. Protect from freezing and physical damage. Keep away from food and beverages. Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Store in cool, dry conditions in well sealed containers. Store with like hazards.

SECTION 8: Exposure controls/personal protection

Control Parameters: 7440-21-3, Silicon, TWA 10 mg/m3 USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000.

Appropriate Engineering controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use/handling. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or dusts (total/respirable) below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Use under a fume hood.

Respiratory protection: Not required under normal conditions of use. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. When necessary use NIOSH approved breathing equipment.

Protection of skin: Select glove material impermeable and resistant to the substance. Select glove material based on rates of diffusion and degradation. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Use proper glove removal technique without touching outer surface. Avoid skin contact with used gloves. Wear protective clothing.

Eye protection: Wear equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses or goggles are appropriate eye protection.

General hygienic measures: Perform routine housekeeping. Wash hands before breaks and at the end of work. Avoid contact with skin, eyes, and clothing. Before wearing wash contaminated clothing.

SECTION 9: Physical and chemical properties

Appearance (physical state, color):	Powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined Not determined
Odor:	Odorless	**Vapor pressure:**	Not determined
Odor threshold:	Not determined	**Vapor density:**	Not determined
pH-value:	Not Determined	**Relative density:**	2.33 g/mL at 25 °C (77 °F)
Melting/Freezing point:	Melting point/range: 1,410 °C (2,570 °F) - lit.	**Solubilities:**	Molecular Weight: 28.09.
Boiling point/Boiling range:	2,355 °C (4,271 °F) - lit	**Partition coefficient (n-octanol/water):**	Not determined
Flash point (closed cup):	Not determined	**Auto/Self-ignition temperature:**	> 400 °C (> 752 °F)
Evaporation rate:	Not determined	**Decomposition temperature:**	Not determined
Flammability (solid, gaseous):	The substance or mixture is a flammable solid with the category 2	**Viscosity:**	a. Kinematic: Not determined b. Dynamic: Not determined

Possible hazardous reactions:

Reacts violently or explosively with incompatibles. Reacts with most metals to produce hydrogen gas, which may form explosive mixtures with air.

Conditions to avoid:

Store away from incompatible substances. excess heat.

Incompatible materials:

Organics. Metals. Strong acids. Strong bases. Alcohols. Chlorine. halogenated compounds. Combustible materials. Chlorates. Alkalines. Carbides. Fulminates. Reducing agents. Nitrates. Acetic acid. Oxidizing agents.

Hazardous decomposition products:

Oxides of sulfur. Carcinogenic mists/aerosols. Oxygen.

SECTION 11: Toxicological information

Acute Toxicity:		
Oral:	7664-93-9	LD50 Rat: 2140 mg/kg
Inhalation:	7664-93-9	LD50 Rat: 510 mg/m3 - 2h
Chronic Toxicity:		
Inhalation:		Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath
Oral:		Repeated exposure can cause damage to teeth and upset stomach
Corrosion Irritation:		
Dermal:	7664-93-9	Rabbit - Extremely corrosive and destructive to tissue.
Ocular:	7664-93-9	Rabbit - Corrosive to eyes.
Sensitization:		No additional information.
Single Target Organ (STOT):		No additional information.
Numerical Measures:		No additional information.
Carcinogenicity:		Strong inorganic acid mists containing sulfuric acid: IARC Group 1
Mutagenicity:		No additional information.
Reproductive Toxicity:		No additional information.

SECTION 12: Ecological information

Ecotoxicity:
7664-93-9: EC50 - Daphnia magna (Water flea) - 29 mg/l - 24 h

7664-93-9: LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h

Persistence and degradability:

Not applicable for test method.

Bioaccumulative potential:

Not Bioaccumulative.

Mobility in soil:

Aqueous solution has high mobility in soil.

Other adverse effects:

Concentrated sulfuric acid has moderate acute and chronic toxicity to aquatic life, which is driven by the pH of the aquatic environment, as a result of the presence of the acid. Small quantities will be neutralized by natural alkalinity.

SECTION 13: Disposal considerations

Waste disposal recommendations:

Product/containers must not be disposed together with household garbage. Do not allow product to reach sewage system or open water. It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Consult federal state/ provincial and local regulations regarding the proper disposal of waste material that may incorporate some amount of this product.

SECTION 14: Transport information

UN-Number:

2796

UN proper shipping name:

Sulfuric Acid Solution

Transport hazard class(es):

Class:
8 Corrosive substances

Packing group: II
Environmental hazard: None
Transport in bulk:
Name: 49CFR173.242
Ship type: Not Applicable
Pollution category: Y

Special precautions for user:

N34: Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material. A3: For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings. A3, A7, B3, B83, B84, IB2, N34, T8, TP2.

SECTION 15: Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):
Reactive, Acute, Chronic
SARA Section 313 (Specific toxic chemical listings):
7664-93-9 Sulfuric acid.
RCRA (hazardous waste code):
None of the ingredients are listed.
TSCA (Toxic Substances Control Act):
None of the ingredients are listed.
CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):
7664-93-9 sulfuric acid 1000 lb.

Proposition 65 (California):

Chemicals known to cause cancer:
7664-93-9 sulfuric acid.
Chemicals known to cause reproductive toxicity for females:
None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for males:
None of the ingredients are listed.
Chemicals known to cause developmental toxicity:
None of the ingredients are listed.

Canada

Canadian Domestic Substances List (DSL):
All ingredients are listed.
Canadian NPRI Ingredient Disclosure list (limit 0.1%):
None of the ingredients are listed.
Canadian NPRI Ingredient Disclosure list (limit 1%):
7664-93-9 Sulfuric acid.

SECTION 16: Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations. Note. The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material. It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases: None

Abbreviations and Acronyms:

IMDGInternational Maritime Code for Dangerous Goods.
PNECPredicted No-Effect Concentration (REACH).
CFRCode of Federal Regulations (USA).
SARASuperfund Amendments and Reauthorization Act (USA).
RCRAResource Conservation and Recovery Act (USA).
TSCAToxic Substances Control Act (USA).
NPRINational Pollutant Release Inventory (Canada).
DOTUS Department of Transportation.
IATAInternational Air Transport Association.
GHSGlobally Harmonized System of Classification and Labelling of Chemicals.
ACGIHAmerican Conference of Governmental Industrial Hygienists.
CASChemical Abstracts Service (division of the American Chemical Society).
NFPANational Fire Protection Association (USA).
HMISHazardous Materials Identification System (USA).
WHMISWorkplace Hazardous Materials Information System (Canada).
DNELDerived No-Effect Level (REACH).

Effective date: 12.05.2014
Last updated: 06.19.2015

LabLearner
The Science of Learning
Cognitive Learning Systems, Inc.
2750 Paxton Street
Harrisburg, PA 17111
www.LabLearner.com
1.877.LEARN78

MATERIAL SAFETY DATA SHEET

MSDS No.: CC0420
Revision Date: November 23, 2011
Approved by: James A. Bertsch

MSDS No.: CC0420

Section 1 Chemical Product and Company Information

Product	**COPPER METAL**
Synonyms	N/A

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300

Section 2 Hazards Identification

Emergency Overview

CAUTION!
DO NOT BREATHE METAL DUST.
May be harmful if swallowed. Harmful if inhaled as dust or fume. May cause irritation to skin and eyes. Avoid contact with Nitric acid, emits toxic fumes of nitrogen oxides. Target organs: Liver, kidneys.

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Health	0
Fire	0
Reactivity	0
Contact	0

HMIS *

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%	TLV Units
Copper	7440-50-8	100%	TWA: 1.0 mg/m^3 dusts and mists as Cu TWA: 0.2 mg/m^3 fume (ACGIH 2001)

Section 4 First Aid Measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN CONTACT: Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire Fighting Measures

General information: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Non-flammable and non-combustible solid, but air-born dust may ignite. Do not use water to fight fires involving this material.

Extinguishing Media: Use triclass, dry chemical fire extinguisher.

Flash Point: Non-combustible.

Autoignition temperature: N/A

Explosion Limits: Lower: N/A **Upper:** N/A

NFPA

0 = Minimal
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

None listed.

Section 6 Accidental Release Measures

Use proper personal protective equipment as indicated in Section 8. Remove all sources of ignition. Provide adequate ventilation. Recover for use if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water. Avoid runoff into storm sewers and ditches which lead to waterways.

Section 7 Handling & Storage GENERAL STORAGE CODE GREEN

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. For laboratory use only. Not for drug, food or household use. Keep out of reach of children.
Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale dust. Wash thoroughly after handling. Remove and wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure Controls / Personal Protection

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None needed in normal laboratory handling. If dusty conditions prevail, work in a ventilation hood or wear a NIOSH/MSHA-approved dust mask.

Section 9 Physical & Chemical Properties

Physical state: Solid.
Appearance: Reddish-brown, lustrous metal.
Odor: No odor.
pH: N/A
Vapor pressure (mm Hg): 1 mm @ 1628°C
Vapor Density (Air = 1): N/A
Evaporation rate (Butyl acetate = 1): N/A
Viscosity: N/A
Boiling point: 2595°C (4703°F)
Freezing / Melting point: 1083°C (1981°F)
Decomposition temperature: N/A
Solubility: Insoluble.
Specific gravity (H_2O = 1): 8.92 @ 20°C
Percent volatile (%): N/A
Molecular formula: Cu
Molecular weight: 63.55

Section 10 Stability & Reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures, heat, sparks, open flame and other sources of ignition. Acids.

Incompatibilities with other materials: Strong acids, oxidizers, alkalies, bromates, chlorates, iodates, sodium azide, acetyline and halogens.

Hazardous decomposition products: Nitrogen oxide is reacted with nitric acid.

Section 11 Toxicological Information

Effects of overexposure: Inhalation of this material can cause intense sneezing, nausea, vomiting, weakness and metal fume fever. Ingestion of this material may cause moderate irritation to the stomach lining. If product gets into eyes, corneal abrasions may occur. May cause irritation on contact with skin. Repeated or prolonged exposure may cause liver and kidney damage, with an increased risk with Wilson's disease.

ORL-RAT LD50: N/A
RTECS #: GL5325000

Section 12 Ecological Information

Data not yet available.

Section 13 Disposal Considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport Information

UN/NA number: N/A
Shipping name: **Not Regulated.**
Hazard class: N/A
Packing group: N/A
Exceptions: N/A

Section 15 Regulatory Information

TSCA-listed, EINECS-listed (231-159-6), RCRA code D001, Ca Prop 65-Not listed.

Section 16 Additional Information

Section 1 Identification

Nasco
901 Janesville Ave.
Fort Atkinson, WI 53538-0901
Phone: 920-563-2446

CHEMTREC 24 Hour Emergency Phone Number (800) 424-9300
For laboratory and industrial use only.
Not for drug, food or household use.

Product	**COPPER(II) SULFATE, PENTAHYDRATE**
Synonyms	Cupric Sulfate, 5-Hydrate

Section 2 Hazards identification

Signal word: WARNING
Pictograms: GHS07 / GHS09
Target organs: Liver, Kidneys, Lungs, Spleen.

GHS Classification:
Acute toxicity-oral (Category 4)
Skin irritation (Category 2)
Eye irritation (Category 2A)
Aquatic acute toxicity (Category 1)
Aquatic chronic toxicity (Category 1)

GHS Label information: **Hazard statement:**
H302: Harmful if swallowed.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement:
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P312: IF SWALLOWED: Rinse mouth. Call a POISON CENTER or doctor if you feel unwell.
P302+P352: IF ON SKIN: Wash with plenty of water and soap.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313: If skin irritation occurs: Get medical attention.
P337+P313: If eye irritation persists: Get medical attention.
P362+P364: Take off contaminated clothing and wash it before reuse.
P391: Collect spillage.
P501: Dispose of contents/container to a licensed chemical disposal agency in accordance with local/regional/national regulations.

Hazards not otherwise classified:
Health hazards not otherwise classified (HHNOC) - Not Known
Physical hazards not otherwise classified (PHNOC) - Not Known

Section 3 Composition / information on ingredients

Chemical Name	CAS #	%	EINECS
Cupric sulfate	7758-99-8	>99%	231-847-6 (anhydrous)

Section 4 First aid measures

INGESTION: HARMFUL IF SWALLOWED. Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: HARMFUL IF INHALED. CAUSES RESPIRATORY TRACT IRRITATION. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: CAUSES SEVERE EYE IRRITATION. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: CAUSES SKIN IRRITATION. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire fighting measures

Suitable Extinguishing Media: Use any media suitable for extinguishing supporting fire

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental release measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale dusts. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / personal protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Copper, dusts and mists, as Cu	TWA: 1 mg/m^3	TWA: 1 mg/m^3	TWA: 1 mg/m^3

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If dusty conditions prevail, work in fume hood or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical and chemical properties

Appearance: Blue, crystalline solid
Odor: Odorless
Odor threshold: Data not available
pH: 3.7-4.2 (10% solution)
Melting / Freezing point: 150°C (302°F)
Boiling point: Decomposes
Flash point: Non-flammable

Evaporation rate (= 1): Not applicable
Flammability (solid/gas): Not applicable
Explosion limits: Lower / Upper: Not applicable
Vapor pressure (mm Hg): 20 torr @ 22.5°C
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): 2.284
Solubility(ies): 31.6 g/100 ml water @ 0°C

Partition coefficient: Data not available
Auto-ignition temperature: Data not available
Decomposition temperature: 560°C (1040°F)
Viscosity: Data not available.
Molecular formula: $CuSO_4 \cdot 5H_2O$
Molecular weight: 249.68

Section 10 Stability and reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Hygroscopic material. Stable when kept dry, under normal temperature and pressure. Avoid high temperatures, exposure to air and incompatible materials.

Incompatible materials: Reducing agents, acetylene or nitromethane, magnesium, strong bases, alkalines, phosphates, hydrazine, zirconium. Can corrode aluminum, steel and iron.

Hazardous decomposition products: Oxides of sulfur and copper fumes.

Section 11 Toxicological information

Acute toxicity: Oral-rat LD50: 300 mg/kg [Copper sulfate anhydrous]
Skin corrosion/irritation: Data not available
Serious eye damage/irritation: Data not available
Respiratory or skin sensitization: Data not available
Germ cell mutagenicity: Data not available
Carcinogenity: Data not available
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.
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.
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.
Ca Prop 65: This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.
Reproductive toxicity: Data not available
STOT-single exposure: Data not available
STOT-repeated exposure: Data not available
Aspiration hazard: Data not available
Potential health effects:
Inhalation: May cause irritation to the mucous membranes and upper respiratory tract.
Ingestion: Ingestion can cause irritation to the digestive tract and abdominal pain.
Skin: Contact with skin causes slight irritation. Excessive exposure may cause allergic dermatitis. May cause irritation or burns on wet skin.
Eyes: Can cause severe irritation and may result in irreversible eye damage.
Signs and symptoms of exposure: *Note to physician*: Probable mucosal damage may contradict the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed. Wilson's disease can be aggravated by excessive exposure. Symptoms include nausea, vomiting, gastrointestinal pain, diarrhea, dizziness, jaundice, and general debility.
Additional information: RTECS #: GL8900000

Section 12 Ecological information

Toxicity to fish: Salmo gairdneri (fish, estuary, fresh water), LC50 = < 0.75-0.84 mg/L [Copper sulfate anhydrous]
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: 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: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport information

UN/NA number: UN3077
Shipping name: Environmentally hazardous substances, solid, n.o.s., (Cupric sulfate)
Hazard class: 9
Packing group: III
Reportable Quantity: 10 lbs (4.54 kg)
Marine pollutant: Yes
Exceptions: Non regulated equal to or less than 4.539 Kg ; Reportable quantity equal to or more than 4.54 Kg
2020 ERG Guide # 171

Section 15 Regulatory information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	CA Prop 65
Cupric sulfate	Listed	10 lbs (4.54 kg)	Not listed	Not listed	Not listed	This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.

Section 16 Other information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Revision Date: September 24, 2020 **Supercedes:** November 7, 2019

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 *Reviewed on 05/09/2022*

*
1 Identification

· **Product identifier**

· **Trade name: Epsom Salt**

· **Article number:** 050-1159
· **CAS Number:**
10034-99-8
· **EC number:**
231-298-2

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Aqua Solutions, Inc.
6913 Highway 225
DEER PARK, TX 77536
USA
800-256-2586

· **Information department:**
Technical Coordinator
Sherman Nelson shermann@aquasolutions.org
Technical Coordinator
Sherman Nelson shermann@aquasolutions.org
· **Emergency telephone number:**
Chemtrec: 800-424-9300
Canutec: 613-996-6666

*
2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified, according to the Globally Harmonized System (GHS).

· **Label elements**
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
Do not get in eyes, on skin, or on clothing.
Wash thoroughly after handling.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of water.
If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Store in a dry place. Store in a closed container.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 *Reviewed on 05/09/2022*

Trade name: Epsom Salt

(Contd. of page 1)

· ***HMIS-ratings (scale 0 - 4)***

HEALTH 1	*Health = 1*
FIRE 0	*Fire = 0*
REACTIVITY 0	*Reactivity = 0*

· ***Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

*
3 Composition/information on ingredients

· ***Chemical characterization: Substances***
· ***CAS No. Description***
CAS: 10034-99-8 Magnesium Sulfate Heptahydrate
· ***Identification number(s)***
· ***EC number:*** *231-298-2*

4 First-aid measures

· ***Description of first aid measures***
· ***General information:*** *No special measures required.*
· ***After inhalation:*** *Supply fresh air; consult doctor in case of complaints.*
· ***After skin contact:*** *Generally the product does not irritate the skin.*
· ***After eye contact:*** *Rinse opened eye for several minutes under running water.*
· ***After swallowing:*** *If symptoms persist consult doctor.*
· ***Information for doctor:***
· ***Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

5 Fire-fighting measures

· ***Extinguishing media***
· ***Suitable extinguishing agents:*** *Use fire fighting measures that suit the environment.*
· ***Special hazards arising from the substance or mixture*** *No further relevant information available.*
· ***Advice for firefighters***
· ***Protective equipment:*** *No special measures required.*

6 Accidental release measures

· ***Personal precautions, protective equipment and emergency procedures*** *Not required.*
· ***Environmental precautions:*** *Do not allow to enter sewers/ surface or ground water.*
· ***Methods and material for containment and cleaning up:*** *Pick up mechanically.*
· ***Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· ***Protective Action Criteria for Chemicals***
· ***PAC-1:*** *33 mg/m³*

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 Reviewed on 05/09/2022

Trade name: Epsom Salt

(Contd. of page 2)

· **PAC-2:** 370 mg/m³
· **PAC-3:** 2,300 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling** No special measures required.
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
· **Breathing equipment:** Not required.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Not required.
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**

Form:	Crystalline
Color:	White
· **Odor:**	Odorless

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 Reviewed on 05/09/2022

Trade name: Epsom Salt

(Contd. of page 3)

· **Odor threshold:**	Not determined.
· **pH-value:**	5-8
· **Change in condition**	
Melting point/Melting range:	1,124 °C (3424 °F)
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	1.67 g/cm³ (13.93615 lbs/gal)
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water at 20 °C (68 °F):	246 g/l
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Epsom Salt

(Contd. of page 4)

· **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)** Substance is not listed.
· **NTP (National Toxicology Program)** Substance is not listed.
· **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (Assessment by list): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:** Smaller quantities can be disposed of with household waste.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADN, IMDG, IATA**	Not regulated
· **UN proper shipping name**	
· **DOT, ADN, IATA**	Not regulated
· **IMDG**	Not Regulated
	Not regulated
· **Transport hazard class(es)**	
· **DOT, ADN, IMDG, IATA**	
· **Class**	Not regulated
· **Packing group**	
· **DOT, IMDG, IATA**	Not regulated

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 Reviewed on 05/09/2022

Trade name: Epsom Salt

(Contd. of page 5)

· **Environmental hazards:**	
· **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Remarks:**	Not regulated
· **IMDG**	
· **Remarks:**	Not regulated
· **IATA**	
· **Remarks:**	Not regulated
· **UN "Model Regulation":**	Not regulated

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.
· **Sara**
· **Section 355 (extremely hazardous substances):** Substance is not listed.
· **Section 313 (Specific toxic chemical listings):** Substance is not listed.
· **TSCA (Toxic Substances Control Act):**
· **Hazardous Air Pollutants** Substance is not listed.
· **Proposition 65**
· **Chemicals known to cause cancer:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
· **Chemicals known to cause developmental toxicity:** Substance is not listed.

· **Carcinogenic categories**
· **EPA (Environmental Protection Agency)** Substance is not listed.
· **TLV (Threshold Limit Value)** Substance is not listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
Do not get in eyes, on skin, or on clothing.
Wash thoroughly after handling.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of water.
If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Store in a dry place. Store in a closed container.
Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/09/2022 *Reviewed on 05/09/2022*

Trade name: Epsom Salt

(Contd. of page 6)

· ***Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Department issuing SDS:*** *Environment protection department.*
· ***Contact:***
· ***Date of preparation / last revision*** *05/09/2022 / 1.3*
· ***Abbreviations and acronyms:***
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
· **** Data compared to the previous version altered.***

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 Reviewed on 05/10/2021

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1 Identification

· **Product identifier**

· **Trade name: Baking Soda, Laboratory Grade Powder**

· **Article number:** 021-1529
· **CAS Number:**
144-55-8
· **EC number:**
205-633-8

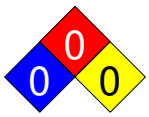
· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Aqua Solutions, Inc.
6913 Highway 225
DEER PARK, TX 77536
USA
800-256-2586

· **Information department:**
Technical Coordinator
Sherman Nelson shermann@aquasolutions.org
· **Emergency telephone number:**
Chemtrec: 800-424-9300
Canutec: 613-996-6666

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified, according to the Globally Harmonized System (GHS).

· **Label elements**
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of water.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**



Health = 0
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 1)

· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
144-55-8 Sodium Bicarbonate
· **Identification number(s)**
· **EC number:** 205-633-8

4 First-aid measures

· **Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** Generally the product does not irritate the skin.
· **After eye contact:** Rinse opened eye for several minutes under running water.
· **After swallowing:** If symptoms persist consult doctor.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Not required.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:** Pick up mechanically.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**
· **PAC-1:** 13 mg/m³
· **PAC-2:** 140 mg/m³
· **PAC-3:** 840 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling** No special measures required.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 Reviewed on 05/10/2021

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 2)

· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
· **Breathing equipment:** Not required.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Not required.
· **Body protection:** Protective work clothing

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Color:	White
· **Odor:**	Odorless
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	300 °C (572 °F)
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 Reviewed on 05/10/2021

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 3)

· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density at 20 °C (68 °F):**	2.16 g/cm³ (18.0252 lbs/gal)
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water at 20 °C (68 °F):	50 g/l
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:** Eyes-Rabbit-mild eye irritation 30s time
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)** Substance is not listed.
· **NTP (National Toxicology Program)** Substance is not listed.

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 Reviewed on 05/10/2021

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 4)

· **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (Assessment by list): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:** Smaller quantities can be disposed of with household waste.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

· **UN-Number**	No Allocation
· **DOT, ADN, IMDG, IATA**	Not regulated
· **UN proper shipping name**	
· **DOT**	Not regulated
	Not regulated
· **ADN, IATA**	Not regulated
· **IMDG**	Not Regulated
	Not regulated
· **Transport hazard class(es)**	
· **DOT**	Not applicable
· **Class**	Not regulated
· **ADN/R Class:**	Not regulated
· **Packing group**	
· **DOT, IMDG, IATA**	Not regulated
· **Environmental hazards:**	
· **Marine pollutant:**	No

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 Reviewed on 05/10/2021

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 5)

· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Remarks:**	Not regulated
· **IMDG**	
· **Remarks:**	Not regulated
· **IATA**	
· **Remarks:**	Not regulated
· **UN "Model Regulation":**	Not regulated

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**
· **Section 355 (extremely hazardous substances):** Substance is not listed.
· **Section 313 (Specific toxic chemical listings):** Substance is not listed.
· **TSCA (Toxic Substances Control Act):** ACTIVE
· **Hazardous Air Pollutants** Substance is not listed.
· **Proposition 65**
· **Chemicals known to cause cancer:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
· **Chemicals known to cause developmental toxicity:** Substance is not listed.

· **Carcinogenic categories**
· **EPA (Environmental Protection Agency)** Substance is not listed.
· **TLV (Threshold Limit Value)** Substance is not listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
· **GHS label elements** Not Applicable
· **Hazard pictograms** Not Applicable
· **Signal word** Not Applicable
· **Hazard statements** Not Applicable
· **Precautionary statements**
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of water.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

· **National regulations:**
· **Additional classification according to Decree on Hazardous Materials:** None
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** Environment protection department.

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/10/2021 *Reviewed on 05/10/2021*

Trade name: Baking Soda, Laboratory Grade Powder

(Contd. of page 6)

· **Contact:**

· **Date of preparation / last revision**

Revision 1.0 05-07-2021: updated hazard information. STN
Revision 0.0, 11-28-2016: Creation date for SDS. STN
05/10/2021 / 1.0

· **Abbreviations and acronyms:**

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit

· *** Data compared to the previous version altered.**

SAFETY DATA SHEET

Revision date 11-November-2022 **Revision Number** 2

1. Identification

Product identifier

Product Name CORN STARCH, POWDER, NF

Other means of identification

Product Code(s) S1552

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use No information available

Restrictions on use No information available

Details of the supplier of the safety data sheet

Supplier Address
Spectrum Chemical Mfg. Corp.
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000

Emergency telephone number

Emergency Telephone Chemtrec 1-800-424-9300

2. Hazard(s) identification

Classification

Combustible dust	Yes

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Warning

Hazard statements
May form combustible dust concentrations in air

Appearance Powder **Physical state** Solid **Odor** No information available

Precautionary Statements - Prevention

Keep away from all ignition sources including heat, sparks, and flame
Keep container closed and grounded
Prevent dust accumulations to minimize explosion hazard

Other information
No information available.

3. Composition/information on ingredients

Substance

Chemical name	CAS No	Weight-%
Starch (Corn)	9005-25-8	100

4. First-aid measures

Description of first aid measures

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects, both acute and delayed

Symptoms No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Large Fire CAUTION: Use of water spray when fighting fire may be inefficient.

Unsuitable extinguishing media Do not scatter spilled material with high pressure water streams.

Specific hazards arising from the chemical Avoid generation of dust. Fine dust dispersed in air may ignite.

Hazardous combustion products Carbon Monoxide, Carbon Dioxide.

Explosion data

Sensitivity to mechanical impact none.

Sensitivity to static discharge yes.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation. Avoid generation of dust. Avoid contact with eyes. Use personal protective equipment as required. Do not breathe dust. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Take precautionary measures against static discharges.

Other information Refer to protective measures listed in Sections 7 and 8.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so. Prevent dust cloud.

Methods for cleaning up Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal. Pick up and transfer to properly labeled containers.

7. Handling and storage

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Avoid generation of dust. Do not breathe dust. Avoid contact with eyes. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Store locked up. Keep out of the reach of children.

8. Exposure controls/personal protection

Control parameters

Exposure Limits .

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Starch (Corn) 9005-25-8	No data available	15 mg/m³ TWA 5 mg/m³ TWA	-

Appropriate engineering controls

Engineering controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection No special protective equipment required.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are

exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Do not breathe dust.

9. Physical and chemical properties

Information on basic physical and chemical properties

Physical state	Solid
Appearance	Powder
Color	White to Off-White
Odor	No information available
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	no data available	None known Neutral
Melting point / freezing point	no data available	None known
Boiling point / boiling range	no data available	None known
Flash point	no data available	None known
Evaporation rate	no data available	None known
Flammability (solid, gas)	no data available	None known
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	No data available	None known
Vapor density	no data available	None known
Relative density	1.5	None known
Water solubility	Slowly soluble in cold water	None known
Solubility(ies)	no data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	no data available	None known
Decomposition temperature		None known
Kinematic viscosity	no data available	None known
Dynamic viscosity	No data available	None known

Other information

Explosive properties	No information available
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Liquid Density	No information available
Bulk density	No information available

10. Stability and reactivity

Reactivity No information available.

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions None under normal processing.

Conditions to avoid Excessive heat. Heating in air. dust formation.

Incompatible materials None known based on information supplied.

Hazardous decomposition products None known based on information supplied.

11. Toxicological information

Information on likely routes of exposure

Product Information .

Inhalation Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract.

Eye contact Specific test data for the substance or mixture is not available.

Skin contact Specific test data for the substance or mixture is not available.

Ingestion Specific test data for the substance or mixture is not available.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms No information available.

Acute toxicity

Numerical measures of toxicity
No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation No information available.
Serious eye damage/eye irritation No information available.
Respiratory or skin sensitization No information available.
Germ cell mutagenicity No information available.

Reproductive toxicity No information available.

STOT - single exposure No information available.
STOT - repeated exposure No information available.
Target organ effects respiratory system, Eyes, Skin.

Aspiration hazard No information available.

Other adverse effects No information available.

Interactive effects No information available.

12. Ecological information

Ecotoxicity The environmental impact of this product has not been fully investigated.

Persistence and degradability No information available.
Bioaccumulation Inherently biodegradable.

Other adverse effects No information available.

13. Disposal considerations

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

14. Transport information

DOT	not regulated
TDG	not regulated
MEX	not regulated
ICAO (air)	not regulated
IATA	not regulated
IMDG	not regulated
RID	not regulated
ADR	not regulated
ADN	not regulated

15. Regulatory information

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	This product complies with ENCS:
IECSC	This product complies with China:
KECL	Complies
PICCS	Complies
AICS	All the constituents of this material are listed on the Australian Inventory of Chemical Substances (AICS).

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Starch (Corn) 9005-25-8	-	Present	Present

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

NFPA
Health hazards 0
Flammability 1
Instability 0
Physical and chemical properties -
HMIS
Health hazards 0
Flammability 0
Physical hazards 0
Personal protection X

Key or legend to abbreviations and acronyms used in the safety data sheet
Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value		

Key literature references and sources for data used to compile the SDS
Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
Japan GHS Classification
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine's PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set

World Health Organization

Revision date	11-November-2022
Revision Note	No information available.

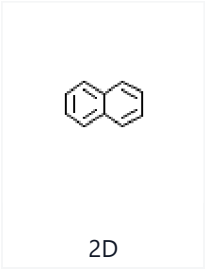
Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Naphthalene

Read about Laboratory Chemical Safety Summary (LCSS) project

PubChem CID	931
Structure	 2D
Synonyms	naphthalene 91-20-3 Naphthalin Albocarbon Tar camphor
Molecular Formula	$C_{10}H_8$
Molecular Weight	128.17 g/mol *Computed by PubChem 2.2 (PubChem release 2021.10.14)*

Contents

1 GHS Classification

1 of 7 View All

Note	*Pictograms displayed are for > 99.9% (2919 of 2920) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for < 0.1% (1 of 2920) of reports.*
Pictogram(s)	 Flammable, Irritant, Health Hazard, Environmental Hazard
Signal	**Danger**
GHS Hazard Statements	H228 (39.1%): Flammable solid [**Danger** Flammable solids] H302 (99.8%): Harmful if swallowed [**Warning** Acute toxicity, oral] H351 (98.9%): Suspected of causing cancer [**Warning** Carcinogenicity] H400 (99.6%): Very toxic to aquatic life [**Warning** Hazardous to the aquatic environment, acute hazard] H410 (99.9%): Very toxic to aquatic life with long lasting effects [**Warning** Hazardous to the aquatic environment, long-term hazard]
Precautionary Statement Codes	P203, P210, P240, P241, P264, P270, P273, P280, P301+P317, P318, P330, P370+P378, P391, P405, and P501

	(The corresponding statement to each P-code can be found at the GHS Classification page.)
ECHA C&L Notifications Summary	*Aggregated GHS information provided per 2920 reports by companies from 50 notifications to the ECHA C&L Inventory. Each notification may be associated with multiple companies.* *Reported as not meeting GHS hazard criteria per 1 of 2920 reports by companies. For more detailed information, please visit **ECHA C&L website.*** *There are 49 notifications provided by 2919 of 2920 reports by companies with hazard statement code(s).* *Information may vary between notifications depending on impurities, additives, and other factors. The percentage value in parenthesis indicates the notified classification ratio from companies that provide hazard codes. Only hazard codes with percentage values above 10% are shown.*

▸ European Chemicals Agency (ECHA)

2 Identifiers

2.1 CAS

91-20-3

▸ Australian Industrial Chemicals Introduction Scheme (AICIS); CAMEO Chemicals; CAS Common C…

25135-16-4

▸ EPA Chemicals under the TSCA

31807-65-5

▸ EPA DSSTox

287399-39-7

▸ European Chemicals Agency (ECHA)

2.2 InChI

InChI=1S/C10H8/c1-2-6-10-8-4-3-7-9(10)5-1/h1-8H

Computed by InChI 1.0.6 (PubChem release 2021.10.14)

▸ PubChem

2.3 InChIKey

UFWIBTONFRDIAS-UHFFFAOYSA-N

Computed by InChI 1.0.6 (PubChem release 2021.10.14)

▸ PubChem

3 Physical Properties

3.1 Physical Description

Naphthalene appears as a white crystalline volatile solid with a strong coal-tar odor. The solid is denser than **water** and insoluble in **water**. Burns, but may be difficult to ignite. In the molten form it is very hot. Exposure to skin must be avoided. Also the vapors given off by the material may be toxic. Used as a moth repellent, fumigant, lubricants, and to make other chemicals, and for many other uses

▸ CAMEO Chemicals

Naphthalene, methylnaphthalenes appears as a black liquid with the odor of coal tar. Negligibly soluble in **water**. Slightly denser than **water**. Vapors, fumes or direct contact may irritate the eyes. Direct skin contact may produce severe burns. Inhalation may produce mucous irritation, dizziness, loss of coordination, cardiovascular collapse and death.

▸ CAMEO Chemicals

View More...

3.2 Odor

Aromatic odor

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. V3: 2594

▸ Hazardous Substances Data Bank (HSDB)

Odor of mothballs

NIOSH. NIOSH Pocket Guide to Chemical Hazards. Department of Health & Human Services, Centers for Disease Control & Prevention. National Institute for Occupational Safety & Health. DHHS (NIOSH) Publication No. 2010-168 (2010). Available from: ***https://www.cdc.gov/niosh/npg***

▸ **Hazardous Substances Data Bank (HSDB)**

Characteritic odor (plates)

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. V3: 2594

▸ **Hazardous Substances Data Bank (HSDB)**

3.3 Boiling Point

424 °F at 760 mmHg (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ **CAMEO Chemicals**

217.9 deg C

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. Cambridge, UK: Royal Society of Chemistry, 2013., p. 1187

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

3.4 Melting Point

176.4 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ **CAMEO Chemicals**

80.2 °C

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. Cambridge, UK: Royal Society of Chemistry, 2013., p. 1187

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

3.5 Flash Point

190 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

174 °F (NFPA, 2010)

National Fire Protection Association. 2010. Fire Protection Guide to Hazardous Materials, 14th edition, edited by Guy R. Colonna. Quincy, MA: National Fire Protection Association. Note that this information is subject to the copyright restrictions of the organization that provided the data.

▸ CAMEO Chemicals

View More...

3.6 Solubility

less than 1 mg/mL at 72 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

In water, 31 mg/L at 25 °C

Pearlman RS et al; J Chem Ref Data 13: 555-562 (1984)

▸ Hazardous Substances Data Bank (HSDB)

View More...

3.7 Density

1.15 (NIOSH, 2024) - Denser than water; will sink

▸ CAMEO Chemicals

1.162 at 20 °C/4 °C

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. Cambridge, UK: Royal Society of Chemistry, 2013., p. 1187

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

3.8 Vapor Density

4.42 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ **CAMEO Chemicals**

4.42 (Air = 1)

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. V3: 2594

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

3.9 Vapor Pressure

0.05 mmHg at 68 °F ; 1 mmHg at 126.7 °F (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ **CAMEO Chemicals**

0.08 [mmHg]

▸ **Haz-Map, Information on Hazardous Chemicals and Occupational Diseases**

View More...

3.10 Autoignition Temperature

979 °F (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

▸ CAMEO Chemicals

979 °F (526 °C)

National Fire Protection Association; Fire Protection Guide to Hazardous Materials. 14TH Edition, Quincy, MA 2010, p. 325-91

▸ Hazardous Substances Data Bank (HSDB)

View More...

3.11 Decomposition

When heated to decomposition it emits acrid smoke and irritating fumes.

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 2594

▸ Hazardous Substances Data Bank (HSDB)

3.12 Corrosivity

Melted naphthalene will attack some forms of plastics, rubber, and coatings.

Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) Publication No. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.

▸ Hazardous Substances Data Bank (HSDB)

3.13 Odor Threshold

Odor Threshold Low: 0.0095 [mmHg]

Odor Threshold High: 0.64 [mmHg]

Detection odor threshold from AIHA (mean = 0.038 ppm)

▸ Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

Odor detection in water 6.80 ppm (purity not specified)

Fazzalari, F.A. (ed.). Compilation of Odor and Taste Threshold Values Data. ASTM Data Series DS 48A (Committee E-18). Philadelphia, PA: American Society for Testing and Materials, 1978., p. 113

▸ Hazardous Substances Data Bank (HSDB)

View More...

4 Toxicity Information

4.1 Toxicity Summary

PAH's such as naphthalene are transported throughout the body after binding blood proteins such as albumin. Binding to the aryl hydrocarbon receptor or **glycine** N-methyltransferase induces the expression of cytochrome P450 enzymes (especially CYP1A1, CYP1A2, and CYP1B1). These cytochrome enzymes metabolize PAH's into various toxic intermediates (epoxide intermediates, dihydrodiols, phenols, quinones, and their various combinations). The reactive metabolites of PAHs covalently bind to DNA and other cellular macromolecules, initiating mutagenesis and carcinogenesis. (10, 12, 2, 3). In humans, the metabolite **alpha-naphthol** has been linked to the development of hemolytic anemia in some cases following ingestion or extensive dermal or inhalation exposure. Susceptibility appears to be exacerbated by a deficiency in the **glucose 6-phosphate** dehydrogenase enzyme, or G-6-PD. Over 400 million people have an inherited condition called **glucose-6-phosphate** dehydrogenase deficiency. Exposure to naphthalene is more harmful for these people and may cause hemolytic anemia at lower doses. Some naphthalene metabolites deplete **glutathione** stores in affected tissues such as the lungs, leading to toxicity. The metabolites responsible for **glutathione** depletion have been identified as naphthalene oxide or **1,2-naphthoquinone** and **1,4-naphthoquinone**.

▸ Toxin and Toxin Target Database (T3DB)

4.2 Human Toxicity Values

The lethal oral doses determined in cases of accidental poisoning are 5-15 g for adults and 2 g within two days for a six-year old child.

WHO/FAO; Environmental Health Criteria Document No. 202: Selected non-Heterocyclic Polycyclic Aromatic Hydrocarbons (1988). Available from, as of January 23, 2013: ***https://www.inchem.org/pages/ehc.html***

▸ Hazardous Substances Data Bank (HSDB)

4.3 Non-Human Toxicity Values

LD50 Sprague Dawley rat oral 2.6 g/kg

Papciak RJ, Mallory VT; J Am Coll Toxicol Pt B: Acute Toxicity Data 1 (1): 17 (1990)

▸ **Hazardous Substances Data Bank (HSDB)**

LD50 New Zealand White rabbit dermal >2.0 g/kg

Papciak RJ, Mallory VY; J Am Coll Toxicol Pt B: Acute Toxicity Data 1 (1): 17 (1990)

▸ **Hazardous Substances Data Bank (HSDB)**

LD50 Male CD-1 mouse gavage 533 mg/kg

USEPA/ODW; Drinking Water Health Advisories for 15 Volatile Organic Chemicals p. I-7 (1990)

▸ **Hazardous Substances Data Bank (HSDB)**

LD50 Female CD-1 mouse gavage 710 mg/kg

USEPA/ODW; Drinking Water Health Advisories for 15 Volatile Organic Chemicals p. I-7 (1990)

▸ **Hazardous Substances Data Bank (HSDB)**

For more Non-Human Toxicity Values (Complete) data for NAPHTHALENE (13 total), please visit the **HSDB record page**.

▸ **Hazardous Substances Data Bank (HSDB)**

5 Exposure Limits

5.1 Immediately Dangerous to Life or Health (IDLH)

250 ppm (NIOSH, 2024)

▸ **CAMEO Chemicals**

250 ppm [From NPG: Naphthalene] (NIOSH, 2024)

▸ **CAMEO Chemicals**

250.0 [ppm]

Excerpts from Documentation for IDLHs: Human data: The probable oral lethal dose has been reported to be between 5 and 15 grams [Gerarde 1960]. [Note: An oral dose between 5 and 15

grams is equivalent to a worker being exposed to about 600 to 1,800 ppm for 30 minutes, assuming a breathing rate of 50 liters per minute and 100% absorption.]

- Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

250 ppm

NIOSH. NIOSH Pocket Guide to Chemical Hazards. Department of Health & Human Services, Centers for Disease Control & Prevention. National Institute for Occupational Safety & Health. DHHS (NIOSH) Publication No. 2010-168 (2010). Available from: ***https://www.cdc.gov/niosh/npg***

- Hazardous Substances Data Bank (HSDB); Occupational Safety and Health Administration (OSHA)

250 ppm

See: 91203

- The National Institute for Occupational Safety and Health (NIOSH)

5.2 Recommended Exposure Limit (REL)

REL-TWA (Time Weighted Average)

10 ppm (50 mg/m^3)

- Occupational Safety and Health Administration (OSHA)

REL-STEL (Short Term Exposure Limit)

15 ppm (75 mg/m^3)

- Occupational Safety and Health Administration (OSHA)

TWA 10 ppm (50 mg/m^3) ST 15 ppm (75 mg/m^3)

- The National Institute for Occupational Safety and Health (NIOSH)

5.3 Permissible Exposure Limit (PEL)

10.0 [ppm]

- Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

PEL-TWA (8-Hour Time Weighted Average)

10 ppm (50 mg/m^3)

- Occupational Safety and Health Administration (OSHA)

TWA 10 ppm (50 mg/m^3) See Appendix G

- The National Institute for Occupational Safety and Health (NIOSH)

5.4 Threshold Limit Values (TLV)

10.0 [ppm]

- Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

8 hr Time Weighted Avg (TWA): 10 ppm, skin.

American Conference of Governmental Industrial Hygienists. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH, Cincinnati, OH 2014, p. 43

- Hazardous Substances Data Bank (HSDB)

View More...

5.5 Effects of Short Term Exposure

The substance may cause effects on the blood. This may result in lesions of blood cells (haemolysis). The effects may be delayed. Ingestion could cause death. Medical observation is indicated.

- ILO-WHO International Chemical Safety Cards (ICSCs)

5.6 Effects of Long Term Exposure

The substance may have effects on the blood. This may result in chronic haemolytic anaemia. The substance may have effects on the eyes. This may result in development of cataract. This substance is possibly carcinogenic to humans.

- ILO-WHO International Chemical Safety Cards (ICSCs)

5.7 Explosive Limits and Potential

Explosive in the form of vapor or dust when exposed to heat or flame.

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 2594

▸ **Hazardous Substances Data Bank (HSDB)**

LEL of 0.9%, a UEL of 5.9%

Bingham, E.; Cohrssen, B.; Powell, C.H.; Patty's Toxicology Volumes 1-9 5th ed. John Wiley & Sons. New York, N.Y. (2001)., p. V4 335

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

5.8 Acceptable Daily Intakes

The Ten-day Health Advisory (HA) for the 10 kg child is calculated as ... 0.53 mg/l (rounded to 0.5 mg/l).

USEPA/ODW; Drinking Water Health Advisories for 15 Volatile Organic Chemicals p. I-13 (1990) NTIS No. PB90-259821

▸ **Hazardous Substances Data Bank (HSDB)**

The Longer-term Health Advisory (HA) for a 10 kg child is calculated as ... 0.357 mg/l (rounded to 0.4 mg/l). ... The Longer-term Health Advisory for a 70 kg adult is calculated as ... 1.249 mg/l (rounded to 1 mg/l).

USEPA/ODW; Drinking Water Health Advisories for 15 Volatile Organic Chemicals p. I-14 (1990) NTIS No. PB90-259821

▸ **Hazardous Substances Data Bank (HSDB)**

Oral RfD: 0.02 mg/kg/day (UF: 3,000 MF: 1)

*U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS) on Naphthalene (91-20-3). Available from: **https://www.epa.gov/iris/index.html** on the Substance File List as of July 21, 2003.*

▸ **Hazardous Substances Data Bank (HSDB)**

6 Health and Symptoms

6.1 Physical Dangers

Dust explosion possible if in powder or granular form, mixed with air.

- ILO-WHO International Chemical Safety Cards (ICSCs)

6.2 Chemical Dangers

On combustion, forms irritating and toxic gases. Reacts with strong oxidants. This generates fire and explosion hazard.

- ILO-WHO International Chemical Safety Cards (ICSCs)

6.3 Symptoms

Inhalation Exposure

Headache. Weakness. Sweating. Nausea. Vomiting. Further see Ingestion.

- ILO-WHO International Chemical Safety Cards (ICSCs)

Skin Exposure

See Inhalation.

- ILO-WHO International Chemical Safety Cards (ICSCs)

Eye Exposure

Redness.

- ILO-WHO International Chemical Safety Cards (ICSCs)

Ingestion Exposure

Abdominal pain. Diarrhoea. Sweating. Headache. Fever. Jaundice. Weakness. Dark-coloured urine. Symptoms may be delayed.

- ILO-WHO International Chemical Safety Cards (ICSCs)

irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage

- The National Institute for Occupational Safety and Health (NIOSH)

Symptoms of hemolytic anemia include fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may cause confusion, nausea, vomiting, diarrhea, blood in the urine, and jaundice (yellow coloration of the skin).

▸ Toxin and Toxin Target Database (T3DB)

6.4 Evidence for Carcinogenicity

WEIGHT-OF-EVIDENCE CHARACTERIZATION: Using criteria of the 1986 Guidelines for Carcinogen Risk Assessment, naphthalene is classified in group C, a possible human carcinogen. This is based on the inadequate data of carcinogenicity in humans exposed to naphthalene via the oral and inhalation routes, and the limited evidence of carcinogenicity in animals via the inhalation route. Using the 1996 Proposed Guidelines for Carcinogen Risk Assessment, the human carcinogenic potential of naphthalene via the oral or inhalation routes "cannot be determined" at this time based on human and animal data; however, there is suggestive evidence (observations of benign respiratory tumors and one carcinoma in female mice only exposed to naphthalene by inhalation). Additional support includes increase in respiratory tumors associated with exposure to **1-methylnaphthalene**. At the present time the mechanism whereby naphthalene produces benign respiratory tract tumors are not fully understood, but are hypothesized to involve oxygenated reactive metabolites produced via the cytochrome P-450 monooxygenase system. However, based on the many negative results obtained in genotoxicity tests, a genotoxic mechanism appears unlikely. HUMAN CARCINOGENICITY DATA: Available data are inadequate to establish a causal association between exposure to naphthalene and cancer in humans. Adequately scaled epidemiological studies designed to examine a possible association between naphthalene exposure and cancer were not located. Overall, no data are available to evaluate the carcinogenic potential in exposed human populations.

U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS). Summary for Naphthalene (91-20-3). Available from, as of March 15, 2000: ***https://www.epa.gov/iris/***

▸ Hazardous Substances Data Bank (HSDB)

A3: Confirmed animal carcinogen with unknown relevance to humans.

American Conference of Governmental Industrial Hygienists. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH, Cincinnati, OH 2014, p. 43

▸ Hazardous Substances Data Bank (HSDB)

View More...

6.5 Carcinogen Classification

1 of 2

IARC Carcinogenic Agent	Naphthalene
IARC Carcinogenic Classes	Group 2B: Possibly carcinogenic to humans
IARC Monographs	Volume 82: (2002) Some Traditional Herbal Medicines, Some Mycotoxins, Naphthalene and Styrene

▸ International Agency for Research on Cancer (IARC)

2 of 2	
Carcinogen Classification	2B, possibly carcinogenic to humans. (L135)

▸ Toxin and Toxin Target Database (T3DB)

6.6 Exposure Routes

The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

▸ ILO-WHO International Chemical Safety Cards (ICSCs)

inhalation, skin absorption, ingestion, skin and/or eye contact

▸ The National Institute for Occupational Safety and Health (NIOSH)

Oral (L10); inhalation (L10)

L10: ATSDR - Agency for Toxic Substances and Disease Registry (1995). Toxicological profile for PAHs. U.S. Public Health Service in collaboration with U.S. Environmental Protection Agency (EPA). ***http://www.atsdr.cdc.gov/toxprofiles/tp69.html***

▸ Toxin and Toxin Target Database (T3DB)

6.7 Target Organs

Nervous

Respiratory

▸ EPA Integrated Risk Information System (IRIS)

Eyes, skin, blood, liver, kidneys, central nervous system

▸ The National Institute for Occupational Safety and Health (NIOSH)

6.8 Fire Hazards

Excerpt from ERG Guide 133 [Flammable Solids]:

Flammable/combustible material. May be ignited by friction, heat, sparks or flames. Some may burn rapidly with flare-burning effect. Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence. Substance may be transported in a molten form at a temperature that may be above its flash point. May re-ignite after fire is extinguished. (ERG, 2024)

2024 Emergency Response Guidebook, ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

▸ CAMEO Chemicals

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.). Corrosives in contact with metals may evolve flammable **hydrogen** gas. Containers may explode when heated. For electric vehicles or equipment, ERG Guide 147 (**lithium ion** or **sodium ion** batteries) or ERG Guide 138 (**sodium** batteries) should also be consulted. (ERG, 2024)

2024 Emergency Response Guidebook, ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

▸ CAMEO Chemicals

ERG 2024, Guide 133 (Naphthalene, refined)

· Flammable/combustible material.

· May be ignited by friction, heat, sparks or flames.

· Some may burn rapidly with flare-burning effect.

· Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence.

· Substance may be transported in a molten form at a temperature that may be above its flash point.

· May re-ignite after fire is extinguished.

▸ Emergency Response Guidebook (ERG)

Combustible. Above 80 °C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air.

▸ ILO-WHO International Chemical Safety Cards (ICSCs)

6.9 Hazards Summary

Naphthalene is used in the production of **phthalic anhydride**; it is also used in mothballs. Acute (short- term) exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Cataracts have also been reported in workers acutely exposed to naphthalene by inhalation and ingestion. Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Hemolytic anemia has been reported in infants born to mothers who "sniffed" and ingested naphthalene (as mothballs) during pregnancy. Available data are inadequate to establish a causal relationship between exposure to naphthalene and cancer in humans. EPA has classified naphthalene as a Group C, possible human carcinogen.

▸ EPA Air Toxics

Ingestion of high doses of naphthalene can induce methemoglobinemia and precipitate subacute hemolysis. The lethal dose orally for an adult is 5-15 grams. Workers deficient in **glucose-6-phosphate** dehydrogenase are more susceptible to hemolysis. A 1956 study found cataracts in 8 of 21 workers who melted naphthalene in open vats. After new procedures to reduce exposures, no further cataracts were reported. [ACGIH] Chronic sniffing of naphthalene containing mothballs can cause liver necrosis. [HSDB] Naphthalene is not hepatotoxic in experimental animal studies or in human exposures. [Zimmerman, p. 367] Suspected germ cell mutagen (3B); [MAK]

ACGIH - Documentation of the TLVs and BEIs, 7th Ed. Cincinnati: ACGIH Worldwide, 2020.

Zimmerman - Zimmerman HJ. Hepatotoxicity. Philadelphia: Lippincott Williams & Wilkins, 1999., p. 367

▸ Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

6.10 Fire Potential

Flammable in the presence of a source of ignition, through friction or retained heat.

*Sigma-Aldrich; Material Safety Data Sheet for Naphthalene, Product Number: 84679, Version 5.2 (Revision Date 4/12/2013). Available from, as of January 22, 2014: **https://www.sigmaaldrich.com/safety-center.html***

▸ Hazardous Substances Data Bank (HSDB)

Combustible

International Program on Chemical Safety/Commission of the European Union; International Chemical Safety Card on Naphthalene (April 2005). Available from, as of January 22, 2014: ***https://www.inchem.org/pages/icsc.html***

▸ Hazardous Substances Data Bank (HSDB)

6.11 Skin, Eye, and Respiratory Irritations

Naphthalene can be irritating to the skin.

Mason RT; Naphthalene. Kirk-Othmer Encyclopedia of Chemical Technology (1999-2014). John Wiley & Sons, Inc. Online Posting Date: January 25, 2002

▸ Hazardous Substances Data Bank (HSDB)

Naphthalene vapors are irritating to the eyes and mucous membranes ... .

Dart, R.C. (ed). Medical Toxicology. Third Edition, Lippincott Williams & Wilkins. Philadelphia, PA. 2004., p. 1316

▸ Hazardous Substances Data Bank (HSDB)

7 First Aid

EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with **water** or **normal saline** solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

SKIN: IMMEDIATELY flood affected skin with **water** while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and **water**. IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if

not available, use a level of protection greater than or equal to that advised under Protective Clothing.

INGESTION: If the victim is conscious and not convulsing, give 1 or 2 glasses of **water** to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Generally, the induction of vomiting is NOT recommended outside of a physician's care due to the risk of aspirating the chemical into the victim's lungs. However, if the victim is conscious and not convulsing and if medical help is not readily available, consider the risk of inducing vomiting because of the high toxicity of the chemical ingested. Ipecac syrup or salt **water** may be used in such an emergency. IMMEDIATELY transport the victim to a hospital. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

> *National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.*

▸ **CAMEO Chemicals**

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

Refer to the "General First Aid" section. Specific First Aid: For corrosives, in case of contact, immediately flush skin or eyes with running **water** for at least 30 minutes. Additional flushing may be required. (ERG, 2024)

> *2024 Emergency Response Guidebook,* ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

▸ **CAMEO Chemicals**

ERG 2024, Guide 133 (Naphthalene, refined)

General First Aid:

· Call 911 or emergency medical service.

· Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.

· Move victim to fresh air if it can be done safely.

· Administer **oxygen** if breathing is difficult.

· If victim is not breathing:

-- DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

-- If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).

-- If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.

· Remove and isolate contaminated clothing and shoes.

· For minor skin contact, avoid spreading material on unaffected skin.

· In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.

· For severe burns, immediate medical attention is required.

· Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.

· Keep victim calm and warm.

· Keep victim under observation.

· For further assistance, contact your local Poison Control Center.

· Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

Specific First Aid:

· Removal of solidified molten material from skin requires medical assistance.

In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

▸ Emergency Response Guidebook (ERG)

(See general first aid procedures)

Eye: Irrigate immediately - If this chemical contacts the eyes, immediately wash (irrigate) the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately.

Skin: Molten flush immediately/solid-liquid soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately - If this chemical has been swallowed, get medical attention immediately.

▸ The National Institute for Occupational Safety and Health (NIOSH)

8 Flammability and Explosivity

8.1 Flammable Limits

Lower flammable limit: 0.9% by volume; Upper flammable limit: 5.9% by volume

National Fire Protection Association; Fire Protection Guide to Hazardous Materials. 14TH Edition, Quincy, MA 2010, p. 325-91

▸ Hazardous Substances Data Bank (HSDB)

Flammability

Combustible Solid, but will take some effort to ignite.

▸ The National Institute for Occupational Safety and Health (NIOSH)

8.2 Lower Explosive Limit (LEL)

0.9 % (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

0.9%

▸ Occupational Safety and Health Administration (OSHA); The National Institute for Occupational S...

8.3 Upper Explosive Limit (UEL)

5.9 % (NTP, 1992)

National Toxicology Program, Institute of Environmental Health Sciences, National Institutes of Health (NTP). 1992. National Toxicology Program Chemical Repository Database. Research Triangle Park, North Carolina.

▸ CAMEO Chemicals

5.9%

▸ Occupational Safety and Health Administration (OSHA); The National Institute for Occupational S...

8.4 NFPA Hazard Classification

1 of 2 View All

NFPA 704 Diamond	 2-2-0
NFPA Health Rating	2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
NFPA Fire Rating	2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air.
NFPA Instability Rating	0 - Materials that in themselves are normally stable, even under fire conditions.

▸ Hazardous Substances Data Bank (HSDB)

8.5 Critical Temperature & Pressure

Critical temperature: 887.4 °F = 475.2 °C = 748.4 K

U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

▸ Hazardous Substances Data Bank (HSDB)

Critical pressure: 588 PSI = 40.0 atm = 4.05 megaNewtons/sq m

U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

▸ Hazardous Substances Data Bank (HSDB)

9 Stability and Reactivity

9.1 Hazardous Reactivities & Incompatibilities

Strong oxidizers, **chromic anhydride**

▸ The National Institute for Occupational Safety and Health (NIOSH)

9.2 Reactivity Profile

Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic hydrocarbons, such as NAPHTHALENE, and strong oxidizing agents. They can react exothermically with bases and with diazo compounds. Substitution at the **benzene** nucleus occurs by halogenation (acid catalyst), nitration, sulfonation, and the Friedel-Crafts reaction. Naphthalene, **camphor**, **glycerol**, or turpentine will react violently with **chromic anhydride** [Haz. Chem. Data 1967. p 68]. Friedel-Crafts acylation of naphthalene using **benzoyl chloride**, catalyzed by AlCl3, must be conducted above the melting point of the mixture, or the reaction may be violent [Clar, E. et al., Tetrahedron, 1974, 30, 3296].

- CAMEO Chemicals

A mixture containing NAPHTHALENE and METHYLNAPHTHALENES may react vigorously with strong oxidizing agents. Can react exothermically with bases and with diazo compounds. Naphthalene reacts violently with **chromic anhydride** [Haz. Chem. Data 1967. p 68]. Friedel-Crafts acylation of naphthalene using **benzoyl chloride**, catalyzed by AlCl3, must be conducted above the melting point of the mixture, or the reaction may be violent [Clar, E. et al., Tetrahedron, 1974, 30, 3296].

- CAMEO Chemicals

9.3 Reactivity Alerts

Highly Flammable

- CAMEO Chemicals

10 Storage and Handling

10.1 Safe Storage

Separated from strong oxidants and food and feedstuffs. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing.

- ILO-WHO International Chemical Safety Cards (ICSCs)

10.2 Storage Conditions

Without inert-gas blanketing and at the temperature normally used for the storage of molten naphthalene, i.e., 90 °C, the vapors above the liquid are within the flammability limits. Thus, storage tanks containing molten naphthalene have a combustible mixture in the vapor space and care must be taken to eliminate all sources of ignition around such systems. Naphthalene dust can form explosive mixtures with air which necessitates the design and operation of solid handling systems.

Mason RT; Naphthalene. Kirk-Othmer Encyclopedia of Chemical Technology (1999-2014). John Wiley & Sons, Inc. Online Posting Date: January 25, 2002

▸ **Hazardous Substances Data Bank (HSDB)**

Store in a cool, dry, well-ventilated location. Separate from oxidizing materials. May be stored under **nitrogen** gas.

National Fire Protection Association; Fire Protection Guide to Hazardous Materials. 14TH Edition, Quincy, MA 2010, p. 49-105

▸ **Hazardous Substances Data Bank (HSDB)**

View More...

10.3 Personal Protective Equipment (PPE)

Excerpt from NIOSH Pocket Guide for Naphthalene:

Skin: PREVENT SKIN CONTACT - Wear appropriate personal protective clothing to prevent skin contact.

Eyes: PREVENT EYE CONTACT - Wear appropriate eye protection to prevent eye contact.

Wash skin: WHEN CONTAMINATED - The worker should immediately wash the skin when it becomes contaminated.

Remove: WHEN WET OR CONTAMINATED - Work clothing that becomes wet or significantly contaminated should be removed and replaced.

Change: DAILY - Workers whose clothing may have become contaminated should change into uncontaminated clothing before leaving the work premises. (NIOSH, 2024)

▸ **CAMEO Chemicals**

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE. Structural firefighters' protective clothing provides thermal protection but only limited chemical protection. (ERG, 2024)

2024 Emergency Response Guidebook, ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

▸ **CAMEO Chemicals**

View More...

10.4 Respirator Recommendations

NIOSH/OSHA

Up to 100 ppm:

(APF = 10) Any air-purifying half-mask respirator with organic vapor cartridge(s) in combination with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100, P100.

Click here for information on selection of N, R, or P filters.*

(APF = 10) Any supplied-air respirator*

Up to 250 ppm:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

(APF = 50) Any air-purifying full-facepiece respirator equipped with organic vapor cartridge(s) in combination with an N100, R100, or P100 filter.

Click here for information on selection of N, R, or P filters.

(APF = 25) Any powered, air-purifying respirator with an organic vapor cartridge in combination with a high-efficiency particulate filter.*

(APF = 50) Any self-contained breathing apparatus with a full facepiece

(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter.

Click here for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection

- The National Institute for Occupational Safety and Health (NIOSH)

10.5 Nonfire Spill Response

Excerpt from ERG Guide 133 [Flammable Solids]:

ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area. Do not touch or walk through spilled material.

SMALL DRY SPILL: With clean shovel, place material into clean, dry container and cover loosely; move containers from spill area.

LARGE SPILL: Wet down with **water** and dike for later disposal. Prevent entry into waterways, sewers, basements or confined areas. (ERG, 2024)

2024 Emergency Response Guidebook, ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

- CAMEO Chemicals

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET **WATER** INSIDE CONTAINERS. (ERG, 2024)

2024 Emergency Response Guidebook, ***https://www.phmsa.dot.gov/training/hazmat/erg/emergency-response-guidebook-erg***

- CAMEO Chemicals

11 Cleanup and Disposal

11.1 Spillage Disposal

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

- ILO-WHO International Chemical Safety Cards (ICSCs)

11.2 Cleanup Methods

Environmental considerations: Water spill: Use natural barriers or oil spill booms to limit spill travel. Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom. Remove trapped material with suction hoses. Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. /Naphthalene, molten/

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 621

▸ Hazardous Substances Data Bank (HSDB)

Environmental considerations: Water spill: Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom. If dissolved, in region of 10 ppm or greater concentration, apply activated carbon at ten times the spilled amount. Remove trapped material with suction hoses. Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. /Naphthalene, crude or refined/

Association of American Railroads; Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Association of American Railroads, Pueblo, CO. 2005, p. 620

▸ Hazardous Substances Data Bank (HSDB)

View More...

11.3 Disposal Methods

Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U165, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

40 CFR 240-280, 300-306, 702-799 (USEPA); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of April 6, 2014: ***https://www.ecfr.gov***

▸ Hazardous Substances Data Bank (HSDB)

SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion,

it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

▸ Hazardous Substances Data Bank (HSDB)

View More...

12 Additional Considerations

12.1 Toxic Combustion Products

Hazardous decomposition products formed under fire conditions. - Carbon oxides.

Sigma-Aldrich; Material Safety Data Sheet for Naphthalene, Product Number: 84679, Version 5.2 (Revision Date 4/12/2013). Available from, as of January 22, 2014: ***https://www.sigmaaldrich.com/safety-center.html***

▸ Hazardous Substances Data Bank (HSDB)

13 Information Sources

FILTER BY SOURCE

ALL SOURCES

1. ## Australian Industrial Chemicals Introduction Scheme (AICIS)

Naphthalene
https://services.industrialchemicals.gov.au/search-assessments/

Naphthalene
https://services.industrialchemicals.gov.au/search-inventory/

2. ## CAMEO Chemicals

NAPHTHALENE
https://cameochemicals.noaa.gov/chemical/4005

NAPHTHALENE, METHYLNAPHTHALENES
https://cameochemicals.noaa.gov/chemical/22439

3. ## CAS Common Chemistry

Naphthalene

https://commonchemistry.cas.org/detail?cas_rn=91-20-3

4. ## ChemIDplus

Naphthalene [BSI:ISO]

https://pubchem.ncbi.nlm.nih.gov/substance/?source=chemidplus&sourceid=0000091203

5. ## DTP/NCI

naphthalene

https://dtp.cancer.gov/dtpstandard/servlet/dwindex?searchtype=NSC&outputformat=html&searchlist=37565

6. ## EPA Chemical Data Reporting (CDR)

Naphthalene

https://www.epa.gov/chemical-data-reporting

7. ## EPA Chemicals under the TSCA

Naphthalene

https://www.epa.gov/chemicals-under-tsca

8. ## EPA DSSTox

Naphthalene

https://comptox.epa.gov/dashboard/DTXSID8020913

1,4-Naphthalenediyl

https://comptox.epa.gov/dashboard/DTXSID201315549

9. EPA Integrated Risk Information System (IRIS)

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https://www.epa.gov/web-policies-and-procedures/epa-disclaimers#copyright

Naphthalene

https://iris.epa.gov/ChemicalLanding/&substance_nmbr=436

10. European Chemicals Agency (ECHA)

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https://echa.europa.eu/web/guest/legal-notice

Naphthalene

https://chem.echa.europa.eu/100.001.863

[No public or meaningful name is available]

https://echa.europa.eu/substance-information/-/substanceinfo/100.210.777

Naphthalene (EC: 202-049-5)

https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/50864

685-260-9

https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/215804

11. FDA Global Substance Registration System (GSRS)

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https://www.fda.gov/about-fda/about-website/website-policies#linking

NAPHTHALENE

https://gsrs.ncats.nih.gov/ginas/app/beta/substances/2166IN72UN

12. Hazardous Substances Data Bank (HSDB)

LICENSE
https://www.nlm.nih.gov/web_policies.html

NAPHTHALENE

https://pubchem.ncbi.nlm.nih.gov/source/hsdb/184

13. Human Metabolome Database (HMDB)

Naphthalene

http://www.hmdb.ca/metabolites/HMDB0029751

14. ILO-WHO International Chemical Safety Cards (ICSCs)

NAPHTHALENE

https://www.ilo.org/dyn/icsc/showcard.display?p_version=2&p_card_id=0667

15. Occupational Safety and Health Administration (OSHA)

NAPHTHALENE

https://www.osha.gov/chemicaldata/736

16. The National Institute for Occupational Safety and Health (NIOSH)

Naphthalene

https://www.cdc.gov/niosh-rtecs/QJ802C8.html

Naphthalene

https://www.cdc.gov/niosh/npg/npgd0439.html

17. Haz-Map, Information on Hazardous Chemicals and Occupational Diseases

Naphthalene

https://haz-map.com/Agents/46

18. Emergency Response Guidebook (ERG)

Naphthalene, refined

https://pubchem.ncbi.nlm.nih.gov/erg/

19. EPA Air Toxics

Naphthalene

https://www.epa.gov/sites/default/files/2016-09/documents/naphthalene.pdf

20. Hazardous Chemical Information System (HCIS), Safe Work Australia

naphthalene

http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=3174

21. NITE-CMC

Naphthalene - FY2009 (Revised classification)

https://www.nite.go.jp/chem/english/ghs/09-mhlw-2041e.html

Naphthalene - FY2006 (New/original classication)

https://www.nite.go.jp/chem/english/ghs/06-imcg-0860e.html

Naphthalene - FY2023 (Revised classification)

https://www.nite.go.jp/chem/english/ghs/23-jniosh-2037e.html

22. Regulation (EC) No 1272/2008 of the European Parliament and of the Council

naphthalene

https://eur-lex.europa.eu/eli/reg/2008/1272/2023-07-31

23. Toxin and Toxin Target Database (T3DB)

Naphthalene

http://www.t3db.ca/toxins/T3D0078

24. International Agency for Research on Cancer (IARC)

Naphthalene

https://monographs.iarc.who.int/list-of-classifications

25. PubChem

https://pubchem.ncbi.nlm.nih.gov

Bleach

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/23/2013 Revision date: 10/13/2016 Supersedes: 12/23/2013 Version: 1.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Product name : Bleach

CAS No : 7681-52-9

Product code : VT150

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : For laboratory and manufacturing use only

1.3. Details of the supplier of the safety data sheet

Val Tech Diagnostics, A Division of LabChem Inc
Jackson's Pointe Commerce Park Building 1000
1010 Jackson's Pointe Court
Zelienople, PA 16063
T 412-826-5230
F 724-473-0647

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Skin Irrit. 2 H315
Eye Dam. 1 H318
Aquatic Acute 2 H401

Full text of H statements : see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS05

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H315 - Causes skin irritation
H318 - Causes serious eye damage
H401 - Toxic to aquatic life

Precautionary statements (GHS-US) :
P264 - Wash exposed skin thoroughly after handling
P273 - Avoid release to the environment
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a poison center or doctor/physician
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash it before reuse
P501 - Dispose of contents/container to comply with local, state and federal regulations

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Not applicable

Full text of H-phrases: see section 16

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Water	(CAS No) 7732-18-5	94.75	Not classified
Sodium Hypochlorite	(CAS No) 7681-52-9	5.25	Unst. Expl, H200 Ox. Sol. 2, H272 Skin Corr. 1B, H314 STOT SE 3, H335 Aquatic Acute 1, H400

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention.

First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after skin contact : Causes skin irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

No additional information available

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses. Protective clothing. Gloves.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.

Hygiene measures : Wash exposed skin thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : incompatible materials. Keep container closed when not in use.

Incompatible products : Strong reducing agents. combustible materials. aluminum. metals. Ammonia. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

Personal protective equipment : Safety glasses. Gloves. Protective clothing.

Hand protection : Wear protective gloves.

Eye protection : Chemical goggles or safety glasses.

Skin and body protection : Wear suitable protective clothing.

Respiratory protection : Where exposure through inhalation may occur from use, respiratory protection equipment is recommended.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Yellow liquid.
Color	: Yellow.
Odor	: chlorine-like.
Odor threshold	: 0.3 ppm
pH	: 11.5 - 12.5
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: 12 mm Hg
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Solubility	: Soluble in water.

Log Pow	:	No data available
Log Kow	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Explosion limits	:	No data available

9.2. Other information

VOC content : 0 %

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reacts violently with acids. May react violently with reducing agents. Contact with acids liberates toxic gas.

10.4. Conditions to avoid

Incompatible materials. Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong reducing agents. Water. zinc. metals. aluminum. Ammonia. Strong acids.

10.6. Hazardous decomposition products

Hydrogen chloride. Chlorine. Phosgene.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg

Skin corrosion/irritation	:	Causes skin irritation. pH: 11.5 - 12.5
Serious eye damage/irritation	:	Causes serious eye damage. pH: 11.5 - 12.5
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified

Sodium Hypochlorite (7681-52-9)	
IARC group	3 - Not classifiable

Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	Not classified
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified
Potential Adverse human health effects and symptoms	:	Based on available data, the classification criteria are not met.
Symptoms/injuries after skin contact	:	Causes skin irritation.
Symptoms/injuries after eye contact	:	Causes serious eye damage.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Toxic to aquatic life.

Bleach (7681-52-9)	
LC50 fish 1	4.7 mg/l

Sodium Hypochlorite (7681-52-9)	
EC50 Daphnia 1	2.1 mg/l (EC50; 96 h)
LC50 fish 2	0.19 mg/l (LC50; 96 h)
Threshold limit algae 1	0.84 mg/l (EC50; 24 h)

12.2. Persistence and degradability

Bleach (7681-52-9)	
Persistence and degradability	Not established.

Sodium Hypochlorite (7681-52-9)	
Persistence and degradability	Biodegradability: not applicable.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Bleach (7681-52-9)	
Bioaccumulative potential	Not established.

Sodium Hypochlorite (7681-52-9)	
Bioaccumulative potential	Not bioaccumulative.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to comply with local, state and federal regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT

Not regulated for transport

Additional information

Other information : No supplementary information available.

ADR

Transport document description :

Transport by sea

No additional information available

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

Bleach (7681-52-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Bleach (7681-52-9)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	100 lb

Sodium Hypochlorite (7681-52-9)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	100 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Reactive hazard

Water (7732-18-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Bleach (7681-52-9)	
WHMIS Classification	Class E - Corrosive Material

Sodium Hypochlorite (7681-52-9)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class C - Oxidizing Material Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class E - Corrosive Material Class F - Dangerously Reactive Material

Water (7732-18-5)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations

Water (7732-18-5)

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

C; R34
R31
N; R50

Full text of R-phrases: see section 16

15.2.2. National regulations

Sodium Hypochlorite (7681-52-9)
Listed on the Canadian IDL (Ingredient Disclosure List)

Water (7732-18-5)

15.3. US State regulations

Bleach(7681-52-9)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No

Sodium Hypochlorite (7681-52-9)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Non-significant risk level (NSRL)
No	No	No	No	

Water (7732-18-5)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Non-significant risk level (NSRL)
No	No	No	No	

SECTION 16: Other information

Other information : None.

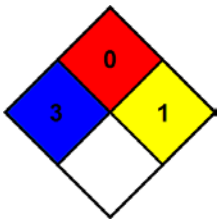
Full text of H-phrases: see section 16:

H200	Unstable explosives
H272	May intensify fire; oxidizer
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H335	May cause respiratory irritation
H400	Very toxic to aquatic life
H401	Toxic to aquatic life

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability : 0 Minimal Hazard

Physical : 1 Slight Hazard

Personal protection : H

SDS US ValTech

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