Conforms to ANSI Z400.5-2004 Standard (United States, Canada, Mexico).

DOBER RESEARCH WORKS

Material Safety Data Sheet

Sulfuric Acid

1. Product and company identification

Product name : Sulfuric Acid

Material uses : Not available.

Supplier/Manufacturer : Dober
11230 Katherine's Crossing
Woodridge, IL, 60517-5075

Validation date : 03/15/2009

Responsible name : Atrion Regulatory Services, Inc.

In case of emergency : ChemTel : 1-813-248-0585 / 1-800-255-3924

Product type : Liquid.

2. Hazards identification

Physical state : Liquid. [Oily liquid.]

Odor : Odorless.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : DANGER !

CAUSES SEVERE EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Skin : Severely corrosive to the skin. Causes severe burns.

Eyes : Severely corrosive to the eyes. Causes severe burns.

Potential chronic health effects

Chronic effects : May cause target organ damage, based on animal data.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : May cause damage to the following organs: lungs, mucous membranes, upper respiratory tract, skin, eyes, teeth.

Over-exposure signs/symptoms

Inhalation : No specific data.

Ingestion : Adverse symptoms may include the following:
stomach pains

2. Hazards identification

Skin : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Eyes : Adverse symptoms may include the following:
pain
watering
redness

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

See toxicological information (section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Sulfuric acid	7664-93-9	60 - 100

Canada

Name	CAS number	%
Sulfuric acid	7664-93-9	60 - 100

Mexico

			Classification					
Name	UN number	IDLH	H	F	R	Special	CAS number	%
Sulfuric acid	UN1830	15 mg/m³	3	0	2		7664-93-9	60 - 100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 20 minutes. Get medical attention immediately.

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion : Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5. Fire-fighting measures

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
nitrogen oxides
sulfur oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). The spilled material may be neutralized with sodium carbonate, sodium bicarbonate or sodium hydroxide. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from alkalis. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Separate from alkalis. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Sulfuric acid	**ACGIH TLV (United States, 1/2008).** TWA: 0.2 mg/m³ 8 hour(s). **NIOSH REL (United States, 6/2008).** TWA: 1 mg/m³ 10 hour(s). **OSHA PEL (United States, 11/2006).** TWA: 1 mg/m³ 8 hour(s).

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Sulfuric acid	US ACGIH 1/2008	-	0.2	-	-	-	-	-	-	-	
	AB 6/2008	-	1	-	-	3	-	-	-	-	
	BC 6/2008	-	0.2	-	-	-	-	-	-	-	[a]
	ON 6/2008	-	0.2	-	-	-	-	-	-	-	[b]
	QC 6/2008	-	1	-	-	3	-	-	-	-	

Form: [a]thoracic [b]thoracic fraction

Mexico

Ingredient	Exposure limits
Sulfuric acid	**ACGIH TLV (United States, 1/2008).** TWA: 0.2 mg/m³ 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: Vapor respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time): Nitrile gloves.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: Splash goggles.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: Overall.

8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Liquid. [Oily liquid.]
Color : Clear. Amber. [Light]
Odor : Odorless.
Molecular weight : 98.08 g/mole
Molecular formula : $H_{2^{\wedge}N\ 4}S$
pH : 0.3 [Acidic.]
Boiling/condensation point : 290°C (554°F)
Melting/freezing point : 10.56°C (51°F)
Relative density : 1.84
Vapor pressure : 0.00027 to 0.16 kPa (0.002 to 1.2 mm Hg)
Vapor density : 3.4 [Air = 1]
Solubility : Soluble in the following materials: cold water and hot water.

10. Stability and reactivity

Chemical stability : The product is stable.
Conditions to avoid : Avoid exposure - obtain special instructions before use.
Materials to avoid : Reactive or incompatible with the following materials: reducing materials, organic materials, alkalis and moisture.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Species	Dose	Result	Exposure
Sulfuric acid	Rat	350 mg/kg	LD50 Oral	-
	Rat	510 mg/m³	LC50 Inhalation Vapor	2 hours

Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.
Skin : Severely corrosive to the skin. Causes severe burns.
Eyes : Severely corrosive to the eyes. Causes severe burns.
Chronic toxicity
Carcinogenicity
Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Sulfuric acid	A2	1	-	-	Proven.	-

IDLH : 15 mg/m³

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Species	Exposure	Result
Sulfuric acid	Crustaceans	48 hours	Acute LC50 70000 to 80000 ug/L
	Crustaceans	48 hours	Acute LC50 42500 ug/L
	Fish	96 hours	Acute LC50 42000 ug/L

Toxicity of the products of biodegradation : The products of biodegradation are more toxic than the original product.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

AERG : 137

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1832	SULFURIC ACID	8	II		**Reportable quantity** 1000 lbs. (454 kg) **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: 30 L **Special provisions** A3, A7, B2, B83, B84, IB2, N34, T8, TP2, TP12
TDG Classification	UN1830	SULFURIC ACID	8	II		**Special provisions** 19

14. Transport information

Mexico Classification	UN1830	SULPHURIC ACID	8	II		-
IMDG Class	UN1830	SULFURIC ACID	8	II		-
IATA-DGR Class	UN1830	SULFURIC ACID	8	II		**Passenger and Cargo Aircraft** Quantity limitation: 1 L **Cargo Aircraft Only** Quantity limitation: 30 L **Limited Quantities - Passenger Aircraft** Quantity limitation: 0.5 L

PG* : Packing group

15. Regulatory information

United States

HCS Classification : Toxic material
Corrosive material
Carcinogen
Target organ effects

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: Sulfuric acid
SARA 302/304 emergency planning and notification: Sulfuric acid
SARA 302/304/311/312 hazardous chemicals: Sulfuric acid
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Sulfuric acid: reactive, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: Sulfuric acid

Clean Air Act (CAA) 112 accidental release prevention: No products were found.

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

15. Regulatory information

SARA 313

		Product name	CAS number	Concentration
Form R - Reporting requirements	:	Sulfuric acid	7664-93-9	60 - 100
Supplier notification	:	Sulfuric acid	7664-93-9	60 - 100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

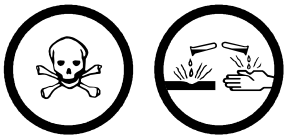
State regulations : **Connecticut Carcinogen Reporting:** This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

California Prop. 65 : No products were found.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Sulfuric acid	Yes.	No.	No.	No.

Canada

WHMIS (Canada) : Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
Class E: Corrosive material



Canadian lists : **CEPA Toxic substances:** This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

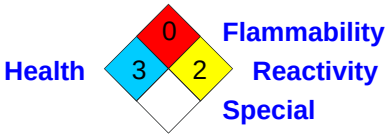
Canada inventory : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

15. Regulatory information

Mexico

Classification :



International regulations

International lists : **Australia inventory (AICS):** This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

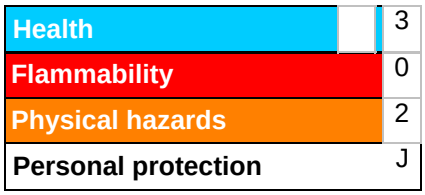
Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : CAUSES SEVERE EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :



The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :

References : - Canada Gazette Part II, Vol. 122, No. 2. Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. - Manufacturer's Material Safety Data Sheet. - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. - Manufacturer's Material Safety Data Sheet.

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Version : 2

16. Other information

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.