

Material Safety Data Sheet

Oleum with <30% free sulfur trioxide

1. Product and company identification

Product name	: Oleum with <30% free sulfur trioxide
Material uses	: Used in the manufacture of organic sulfonates, fibers and explosives.
Headquarters	: Marsulex Inc. 111 Gordon Baker Road Suite 300 North York, ON M2H 3R1 (416) 496-9655 www.marsulex.com
MSDS authored by	: KMK Regulatory Services inc.
<u>In case of emergency</u>	: Canada: CANUTEC +1-613-996-6666 US: CHEMTREC +1-800-424-9300
Product type	: Liquid.

2. Hazards identification

Emergency overview

Color	: Colorless to amber.
Physical state	: Oily liquid.
Odor	: Sharp.
Signal word	: DANGER!
Hazard statements	: MAY BE FATAL IF ABSORBED THROUGH SKIN, SWALLOWED OR INHALED. CAUSES SEVERE RESPIRATORY TRACT BURNS. CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.
Precautions	: Risk of cancer depends on duration and level of exposure to the sulfuric acid mist. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: Mists and vapors may cause irritation of the nose and throat with sneezing, sore throat or runny nose. Overexposure may cause increased pulmonary resistance, transient cough and bronchoconstriction. Severe overexposure may result in lung collapse and pulmonary edema (fluid in the lungs) which can be fatal.
Ingestion	: Severe burning and pain in the mouth, throat and abdomen. Vomiting, diarrhea and perforation of the esophagus and stomach lining may occur which can be fatal.
Skin	: Concentrated solution may cause pain, severe burns and scarring to the skin.
Eyes	: Immediate pain, severe burns and corneal damage, which may result in permanent blindness. Repeated and/or prolonged exposure to mists may cause eye irritation with tearing, pain or blurred vision.
<u>Potential chronic health effects</u>	
Chronic effects	: Contains material that can cause target organ damage.
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.

2. Hazards identification

Target organs : Causes damage to the following organs: mucous membranes, skin, eye, lens or cornea.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : Adverse symptoms may include the following:
stomach pains

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 : Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapors or sprays (mists) may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.

See toxicological information (section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Sulfuric Acid mixt with Sulfur Trioxide	8014-95-7	100

Canada

Name	CAS number	%
Sulfuric Acid mixt with Sulfur Trioxide	8014-95-7	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 : Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

Skin contact : Flush skin with running water for a minimum of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport. While the patient is being transported to a medical facility, apply compresses of cold water. If medical treatment must be delayed, immerse the affected area in cold water. Discard heavily contaminated clothing and shoes in a manner which limits further exposure. Otherwise, wash clothing separately before reuse.

Inhalation : Move victim to fresh air. If breathing is difficult, give oxygen. Please note: Symptoms may be delayed; prompt medical attention may be required. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give Cardiopulmonary Resuscitation (CPR) if there is no pulse AND no breathing. Obtain medical attention IMMEDIATELY.

4. First aid measures

- Ingestion** : DO NOT INDUCE VOMITING. If victim is alert and not convulsing, rinse mouth and give ½ to 1 glass of water to dilute material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY contact local poison control center. Vomiting may need to be induced but should be directed by a physician or a poison control center. IMMEDIATELY transport victim to an emergency facility.
- 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** : DO NOT attempt to neutralize the acid with weak bases since the reaction will produce heat that may extend the corrosive injury and the base will react with the protein to form an impervious layer that will inhibit further removal of the acid. Since re-exposure of the mucous to acid is harmful, be careful to avoid further vomiting and limit fluid to one or two glasses in an adult.
All treatments should be based on observed signs and symptoms of distress in the patient. Medical conditions that may be aggravated by exposure include asthma, bronchitis, emphysema and other lung diseases and chronic nose, sinus or throat conditions. Severity of the burn is generally determined by the concentration of the solution and the duration of exposure. In the event of skin or eye contact, immediate and thorough flushing is essential. Continued washing of the effected area with cold or iced water will be helpful in removing the last traces of sulfuric acid. Cream or ointments should not be applied before or during the washing phase of the treatment.

5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Extinguishing media**
- Suitable** : For small fires use dry chemical or carbon dioxide.
For large fires, flood fire area with water from a distance. Expect violent reaction with water. Do not get solid stream of water on spilled material.
- 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** : Wear a NIOSH/MSHA approved self-contained breathing apparatus if vapors or mists are present and full protective clothing. For fighting fires in close proximity to spill or vapors, use acid-resistant personal protective equipment. Evacuate residents who are downwind of fire. Prevent unauthorized entry to fire area. Dike area to contain runoff and prevent contamination of water sources. Neutralize runoff with lime, soda ash or other suitable neutralizing agents (see Deactivating Chemicals, Section 6). Cool containers that are exposed to flame with streams of water until fire is out.
- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Hazardous in contact with oxidizing materials, forming explosive mixtures. Sulfur burns with a pale blue flame that may be difficult to see in daylight.

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. Shut off all ignition sources. No flares, smoking or flames in hazard area. 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).

6. Accidental release measures

- 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).
- Small spill** : Cover with DRY earth, sand or other non-combustible material. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Large spill** : Prevent liquid from entering sewers or waterways. Dike with inert material (sand, earth, etc.). Collect into containers for reclamation or disposal only if container is suitable to withstand the material. Consider insitu neutralization and disposal. Anhydrous sodium sulfate is useful to treat spills of oleum. It reacts with the liquid to contain and solidify the spill and suppress the fume. Tools and equipment must be properly decontaminated after clean up. Comply with Federal, Provincial/State and local regulations on reporting releases.
- Deactivating Chemicals:** Lime, limestone, soda ash, sodium bicarbonate, dilute sodium hydroxide, dilute aqua ammonia.

7. Handling and storage

- Handling** : Do not ingest. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Wear appropriate Personal Protection Equipment. Do not breathe sprays or mists. Do not ingest. Do not get in eyes, on skin or on clothing. Keep ignition sources away from sulfuric acid storage, handling and transportation equipment. Smoking should be prohibited in areas in which sulfuric acid or oleum are stored or handled. Wash thoroughly after handling. Keep from contact with clothing and other combustible material. Locate safety shower and eyewash station close to chemical handling area. NEVER add water to oleum, as this will result in an extremely violent reaction. CAUTION: Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. Therefore, oleum storage containers may need to be vented to a suitable oleum fume scrubber. People working with this chemical should be properly trained regarding its hazards and its safe use.
- 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	<p>ACGIH TLV (United States, 1/2009). TWA: 0.2 mg/m³ 8 hour(s).</p> <p>NIOSH REL (United States, 6/2008). TWA: 1 mg/m³ 10 hour(s).</p> <p>OSHA PEL (United States, 11/2006). TWA: 1 mg/m³ 8 hour(s).</p>

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
Sulfuric acid	US ACGIH 1/2009	-	0.2	-	-	-	-	-	-	-	[a] [b]
	AB 6/2008	-	1	-	-	3	-	-	-	-	
	BC 6/2008	-	0.2	-	-	-	-	-	-	-	
	ON 6/2008	-	0.2	-	-	-	-	-	-	-	
	QC 6/2008	-	1	-	-	3	-	-	-	-	

Form: [a]thoracic [b]thoracic fraction

8. Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : 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** : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Use only with adequate ventilation.
- 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. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : A NIOSH/MSHA approved air-purifying respirator equipped with acid gas/fume, dust, and mist cartridges for concentrations up to 10 mg/m³. An air-supplied respirator if concentrations are higher or unknown.
- Hands** : Use gloves appropriate for work or task being performed. Recommended: neoprene, vinyl or rubber, PVC.
- Eyes** : Safety eyewear should be used when there is a likelihood of exposure. Recommended: Chemical splash goggles or face shield.
- 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: Full suit.
- 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** : Oily liquid.
- Color** : Colorless to amber.
- Odor** : Sharp.
- Molecular formula** : H₂SO₄-SO₃
- pH** : 0.3 [Acidic.]
- Boiling/condensation point** : (% SO₃): 0%: 290°C (554°F), 10%: 175°C (347°F); 20%: 140°C (284°F); 25%: 130°C (266°F); 37%: 100°C (212°F).
- Melting/freezing point** : 0%: 10.4°C (50.7°F), 10%: -2°C (28.4°F); 20%: 1°C (33.8°F); 25%: 14°C (57.2°F); 7%: 32°C (89.6°F).
- Specific gravity** : 1.89 g/cm³
- Relative density** : 4°C (39°F): 0%: 1.83; 10%: 1.880; 20%: 1.916; 25%: 1.935; 37%: 1.976
- Vapor pressure** : 20°C (68°F): 0%: 0.0035 mmHg; 10%: 0.4 mmHg; 20%: 1.1 mmHg; 25%: 2.9 mmHg, 37%: 47.8 mmHg
- Vapor density** : 2.8 [Air = 1]
- Odor threshold** : <1 ppm
- Evaporation rate** : 0.56 (butyl acetate = 1)
- Solubility** : Miscible in all proportions in water. Reacts violently with water.

10. Stability and reactivity

- Chemical stability** : Stable but dangerously reactive with water and organic materials. Fumes strongly in moist air.
Under Fire Conditions: Decomposes to form oxides of sulfur.
- Conditions to avoid** : No specific data.
- Materials to avoid** : Contact with organic materials (such as chlorates, carbides, fulminates and picrates) may cause fire and explosions. Contact with metals may produce flammable hydrogen gas. NEVER add water to oleum, as this will result in an extremely violent reaction.
- Hazardous decomposition products** : Toxic gases and vapors (e.g. sulfur dioxide, sulfuric acid vapors/mists and sulfur trioxide) may be released when sulfuric acid decomposes.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Sulfuric acid	LD50 Oral	Rat	2140 mg/kg	-
Oleum	LC50 Inhalation Gas.	Rat	347 ppm	1 hours

- Chronic toxicity** : No specific data.

12. Ecological information

- Environmental effects** : Not established

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Sulfuric acid	Acute LC50 42500 ug/L Marine water Acute LC50 42000 ug/L Fresh water	Crustaceans - Pandalus montagui - Adult Fish - Gambusia affinis - Adult	48 hours 96 hours

- Toxicity of the products of biodegradation** : The products of biodegradation are as toxic as the original product.
- Products of degradation** : Decomposition products may include the following materials: sulfur oxides (SO₂, SO₃ etc.)









13. Disposal considerations

- Waste disposal** : The generation of waste should be avoided or minimized wherever possible. This material and its container must be disposed of in a safe way. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. 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.

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

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1831	SULFURIC ACID, FUMING	8 (6.1)	I	 	<p>Reportable quantity 1000 lbs. (454 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p> <p>Cargo aircraft Quantity limitation: 2.5 to 2.5 L</p> <p>Special provisions A3, A7, B84, N34, T20, TP2, TP12, TP13</p>
TDG Classification	UN1831	SULFURIC ACID, FUMING	8	I	 	-
IMDG Class	UN1831	SULPHURIC ACID, FUMING	8 (6.1)	I	 	-
IATA-DGR Class	UN1831	SULPHURIC ACID, FUMING	8 (6.1)	-	 	<p>Passenger and Cargo AircraftQuantity limitation: Forbidden</p> <p>Cargo Aircraft OnlyQuantity limitation: Forbidden</p>

PG* : Packing group

Exemption to the above classification may apply.

AERG : 137

15 . Regulatory information

United States

HCS Classification

: Highly toxic material
Corrosive material
Target organ effects

U.S. Federal regulations

: **United States inventory (TSCA 8b):** All components are 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: Oleum

SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
Oleum: reactive, Immediate (acute) health hazard

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

15 . Regulatory information

Clean Water Act (CWA) 311: Sulfuric acid

Clean Air Act (CAA) 112 accidental release prevention: Oleum

Clean Air Act (CAA) 112 regulated flammable substances: Oleum

Clean Air Act (CAA) 112 regulated toxic substances: Oleum

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) : Listed

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
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:** None of the components are listed.
- Connecticut Hazardous Material Survey:** None of the components are listed.
- Florida substances:** None of the components are listed.
- Illinois Chemical Safety Act:** None of the components are listed.
- Illinois Toxic Substances Disclosure to Employee Act:** None of the components are listed.
- Louisiana Reporting:** None of the components are listed.
- Louisiana Spill:** None of the components are listed.
- Massachusetts Spill:** None of the components are listed.
- Massachusetts Substances:** The following components are listed: Sulfuric acid; Oleum
- Michigan Critical Material:** None of the components are listed.
- Minnesota Hazardous Substances:** None of the components are listed.
- New Jersey Hazardous Substances:** The following components are listed: Sulfuric acid; Oleum
- New Jersey Spill:** None of the components are listed.
- New Jersey Toxic Catastrophe Prevention Act:** None of the components are listed.
- New York Acutely Hazardous Substances:** The following components are listed: Sulfuric acid; Oleum
- New York Toxic Chemical Release Reporting:** None of the components are listed.
- Pennsylvania RTK Hazardous Substances:** The following components are listed: Sulfuric acid; Sulfuric acid
- Rhode Island Hazardous Substances:** None of the components are listed.

California Prop. 65

No products were found.

Canada

WHMIS (Canada) :

- Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
- Class D-2A: Material causing other toxic effects (Very toxic).
- Class E: Corrosive material
- Class F: Dangerously reactive material.

15 . Regulatory information

Canadian lists : **CEPA Toxic substances:** None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Sulfuric acid
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Canada inventory : All components are 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.

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are 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

United States

Label requirements : MAY BE FATAL IF ABSORBED THROUGH SKIN, SWALLOWED OR INHALED. CAUSES SEVERE RESPIRATORY TRACT BURNS. CAUSES EYE AND SKIN BURNS. HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

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

Health	*	3
Flammability		0
Physical hazards		2

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

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

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



16 . Other information

Canada

WHMIS (Canada)

:



References

: - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. ANSI Z400.1, MSDS Standard, 2004. - 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.

Date of issue

: 11/15/2009

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: 11/30/2008

Version

: 5

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.

