



Product Safety Summary

Oleum

CAS No: 8014-95-7

This Product Safety Summary is intended to provide a general overview of the chemical substance. The information in the summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found in the Safety Data Sheet (SDS) for the chemical substance.

Names

- Oleum
- Sulfuric Acid, fuming
- $\text{H}_2\text{SO}_4 \cdot x \text{SO}_3$

Product Overview

Solvay Eco Services does not sell oleum directly to consumers and will not knowingly sell to persons that formulate consumer products containing oleum. Oleum is a widely used industrial chemical utilized as an intermediate to produce many different organic and inorganic chemicals. These include sulfonation (chemically adding sulfate) processes, nylon manufacturing, the production of dyes, nitrating reactions and hydrofluoric acid (HF) production.

Oleum is used in industrial applications and other processes where workplace exposures can occur. There are no direct consumer applications for oleum. **Oleum is dangerous to human health. Oleum is rapidly destructive to all body tissues, causing severe burns which may result in scarring.**

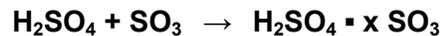
Oleum is consumed in industrial manufacturing processes or recovered and re-used. Oleum can make its way into the environment through unintentional releases (spills) and industrial or consumer discharges. Oleum will not bioaccumulate and is not biodegradable.

When released into the upper atmosphere, oleum exists as sulfuric acid particles or droplets. The acid particles dissolve in clouds, fog, rain, or snow, resulting in very dilute acid solutions. This may impact the environment as wet acid deposition ("acid rain").



Manufacture of Product

Oleum is 100% sulfuric acid (H₂SO₄) containing dissolved sulfur trioxide gas (SO₃). Oleum is produced by continuing to absorb SO₃ gas into a recirculating H₂SO₄ stream. The amount of SO₃ dissolved in the sulfuric acid determines the strength of the oleum. Oleum strengths are typically denoted by percent (%) dissolved SO₃ (e.g. 20% Oleum, 30% Oleum). Oleum is generally denoted:



Oleum is a liquid at moderate temperatures and is stored in specially designed and vented storage tanks.

Product Description

Oleum is a cloudy, gray, fuming, oily, corrosive liquid, with a sharp, penetrating odor. Its composition is that of H₂SO₄ with dissolved SO₃. Typical physical properties for oleum are provided in Table 1.

Table 1: Typical physical properties of common grades of oleum

	20% Oleum	30% Oleum
% Free SO ₃	20	30
Equivalent % H ₂ SO ₄	104.5	106.75
Specific Gravity	1.915	1.952
Boiling Point	286°F (141°C)	246°F (119°C)
Freezing Point	35°F (1.7°C)	71°F (21.9°C)
Weight/US Gallon	7.64 kg (15.97 lbs)	7.38 kg (16.27 lbs)
Flammability	Not flammable	Not flammable
Flash Point	Not applicable	Not applicable

Product Uses

Solvay Eco Services does not sell oleum directly to consumers and will not knowingly sell to persons that formulate consumer products containing oleum. Oleum is used as a basic chemical for sulfonation processes (chemically adding sulfate), nylon manufacturing, the production of dyes, nitrating reactions and hydrofluoric acid (HF) production.



Exposure Potential

Workplace exposure - Oleum is toxic by ingestion, inhalation or contact with skin and eyes. Potential exposures may occur at an oleum manufacturing facility or at a manufacturing facility that handles oleum. Exposure may also occur in the event of a transportation incident. Persons involved in maintenance, sampling and testing activities, or in the loading and unloading of oleum containers are at greater risk of exposure. Following good safe handling practices will minimize the likelihood of exposure to oleum. Persons involved in exposure risk activities should always wear proper personal protective equipment such as rubber gloves and boots, a chemical resistant full acid suit, goggles, face shield, an approved respirator and a hard hat.

Please consult the appropriate Safety Data Sheet for more information on oleum exposures and for information concerning exposure limits.

- **Consumer exposure to products containing oleum - Solvay Eco Services does not sell oleum directly to consumers and will not knowingly sell to persons that formulate consumer products containing oleum.** There are no direct consumer applications for oleum.
- **Environmental releases** - Oleum releases sulfur trioxide gas (SO_3) gas when spilled. The SO_3 quickly reacts with moisture in the air to form tiny droplets of sulfuric acid mist. These H_2SO_4 mist particles appear as a white cloud. Spills of oleum should be contained and isolated from waterways, sewers and drains. Oleum will react violently with water and a considerable amount of heat is generated during dilution. Small spills of oleum should be carefully diluted and then soaked up with an approved absorbent material which can be swept or shoveled up and placed in a suitable container for disposal. The contaminated area should be washed down with water. Lime or soda ash (sodium carbonate) may be used to neutralize contaminated water. Larger spills of oleum should be contained and carefully diluted with water before neutralizing with a suitable neutralizing agent. Disposal should be in accordance with applicable local, state or federal regulations. Persons attempting to clean up oleum spills should wear proper personal protective equipment (see guidelines in the Safety Data Sheet). If required, report spills to the appropriate local, state and federal authorities.
- **Fires** - Oleum is not flammable. However, hydrogen gas is produced when oleum comes in contact with certain metals. Hydrogen gas is explosive in some circumstances.

For additional information concerning oleum emergency response procedures, please consult the Safety Data Sheet.



Health Information

Oleum is corrosive and toxic by ingestion, inhalation or contact with skin and eyes. Effects can be immediate. In the event of exposure to the skin or eyes, the area should be washed with water for at least 30 minutes. Please consult the Safety Data Sheet for additional information.

Exposures to oleum can produce the following adverse health effects:

- **Contact** - Skin exposures to oleum can cause symptoms ranging from minor skin irritation to painful redness and swelling. Severe burns can occur if treatment is delayed. Eye exposure to oleum or SO_3 may result in severe eye irritation, burns or even blindness.
- **Inhalation** - Oleum is harmful if inhaled. It can cause upper respiratory tract irritation, lung irritation, chest pain, wheezing, shortness of breath, a burning sensation, tickling of the nose and throat and sneezing. Repeated exposure to high levels of oleum mist may cause etching of tooth enamel in persons who breathe through their mouths.
- **Ingestion** - Oleum is harmful if ingested. It can cause irritation, abdominal pain, corrosion, burns to mouth and esophagus and death.
- **Other Effects** - Based on available data at the time of their review, the International Agency for the Regulation of Cancer (IARC) and the US National Toxicology Program (NTP) considered strong inorganic acid mist containing sulfuric acid to be a human carcinogen. In 2012 IARC dropped the words "containing sulfuric acid" from their classification citing uncertainty regarding the specific carcinogenic component. Exposure to these strong inorganic acid mists may be encountered in an industrial setting. However, some later epidemiology studies were negative for respiratory cancer. Also, animal studies not considered by NTP and IARC were negative for carcinogenicity.

For more information on health effects or for information concerning proper first aid measures, please consult the Safety Data Sheet.

Environmental Information

Oleum is readily neutralized and will therefore be degraded within the wastewater treatment process. Due to this rapid degradation, an exposure of surface waters to oleum is expected to be negligible. Since ecotoxicological effects of the substance solely result from changes in pH, oleum is considered to not be acutely harmful to aquatic organisms. Further, oleum does not accumulate in the food chain. An exposure assessment was performed for the identified uses and resulted in releases that do not pose a risk for aquatic life. Consequently, all identified uses are considered to be safe for the environment.



For more ecological and environmental information concerning this product, please consult the Safety Data Sheet.

Physical Hazard Information

Oleum is extremely corrosive to many metals. Please consult chemical compatibility tables before selecting vessels, piping, pumps and/or valves for use in oleum service.

Exposure of some metals to oleum can result in the evolution of flammable hydrogen gas. If allowed to accumulate in a confined space. Hydrogen gas can present a fire or explosion hazard.

For more information concerning the physical hazards of this product, please consult the Safety Data Sheet.

Regulatory Information

Regulations may exist that govern the manufacture, sale, export, import, storage, transportation, use and/or disposal of this chemical. These regulations can vary by city, state, country or geographic region. Information may be found by consulting the relevant Safety Data Sheet specific to your country or region.

Additional Information

- Solvay USA Inc. (www.solvaynorthamerica.com)
- Solvay - Rhodia, Eco Services
(www.rhodia.com/en/about_us/businesses/eco_services/index.tcm)
- Solvay - Rhodia, Safety Data Sheets
(http://www.rhodia.com/our_company/businesses/documents/Oleum_20.pdf)
- Contact Solvay, Eco Services. (www.rhodia.com/en/info/contacts.tcm)
- This summary was prepared in November, 2013.



NOTICE

To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither Solvay USA Inc. nor any of its affiliates makes any warranty, express or implied, or accepts any liability in connection with this information or its use. This information is for use by persons at their own discretion and risk and does not relate to use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use in compliance with applicable law, the manner of use and whether any patents are infringed. This information gives typical properties only and is not to be used for specification purposes. Solvay USA Inc. reserves the right to make additions, deletions or modifications to the information at any time without prior notification. Trademarks and/or other products of the company referenced herein are either trademarks or registered trademarks of the company mentioned or its affiliates, unless otherwise indicated.