



OCI Company Ltd.

Material Safety Data Sheet

MSDS

Standard Solution 5N-Sulfuric Acid

Section 1 - Chemical Product and Company Identification

Product name : 5N-Sulfuric Acid

Recommended use : Laboratory chemicals, Testing, Research and Industrial use

Restriction of use : Not for use other than for non-drinking, testing, research and industrial purposes

Company Identification

Company : OCI Company Ltd.

Address : 94, Sogong-ro, Jung-gu, Seoul, KOREA

Tel No. : 82 - 2 - 727 - 9494

Section 2 - Hazards Identification

1) Hazard Classification

Metal corrosion : 1

Acute toxicity (Inhale) : 2

Skin corrosion / irritation : 1

Carcinogenicity : 1A

Specific target organ toxicity following single exposure : 1

Specific target organ toxicity following repeated exposure : 1

Chronic hazard to the aquatic environment : 3

2) Warning signal

Symbol



Signal word

Danger

Hazard statement

H290 May be corrosive to metals

H314 Causes severe skin burns and eye damage

H318 Causes serious eye damage

H330 Fatal if inhaled

H350 May cause cancer

H370 Causes damage to organs

H372 Causes damage to organs through prolonged or repeated exposure

H412 Harmful to aquatic life with long lasting effects

Prevention precautionary statements

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.
P234 Keep only in original container.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 In case of inadequate ventilation, wear respiratory protection.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P311 IF exposed or concerned: Call a POISON CENTER/doctor/
P308+P313 IF exposed or concerned: Get medical advice/attention.
P310 Immediately call a POISON CENTER or doctor/physician.
P314 Get medical advice/attention if you feel unwell.
P320 Specific treatment is urgent (see on this label).
P321 Specific treatment
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P406 Store in corrosive resistant/container with a resistant inner liner.
P501 Dispose of contents/container to the related laws3) NFPA

Health Rating	3
Flammability Rating	0
Reactivity Rating	2

Section 3 - Composition, Information on Ingredients

Component : Sulfuric acid
CAS No. : 7664-93-9
Content : 21 ~ 22%

Component : Water
CAS No. : 7732-18-5
Content : 78~79%

Section 4 - First Aid Measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the

doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed Symptoms: Corrosive to skin and eyes.

Indication of immediate medical attention and special treatment needed Treatment: Treat symptomatically. Symptoms may be delayed.

Section 5 - Fire Fighting Measures

General Fire Hazards: In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Foam, carbon dioxide or dry powder.

Unsuitable extinguishing media: Do not use water as an extinguisher.

Specific hazards arising from the chemical: Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Fight fire from a protected location. Use water SPRAY only to cool containers! Do not put water on leaked material. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

Section 7 - Handling and Storage

Precautions for safe handling: Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash hands thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when adding this material to water. Add material slowly when mixing with water. Do not add water to the material; instead, add the material to the water. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Keep in a cool, well-ventilated place. Keep container tightly closed. Store in a dry place.

Section 8 - Exposure Controls, Personal Protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
SULFURIC ACID - Thoracic fraction.	TWA	0.2 mg/m ³	US. ACGIH Threshold Limit Values (2011)
SULFURIC ACID	REL	1 mg/m ³	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 mg/m ³	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 mg/m ³	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

Appropriate Engineering Controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking.

Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

Section 9 - Physical and Chemical Properties

Appearance

Physical state: Liquid

Form: Liquid

Color: Colorless
Odor: Odorless
Odor threshold: No data available.
pH: 1.05
Melting point/freezing point: -19°C
Initial boiling point and boiling range: No data available.
Flash Point: Nonflammable
Evaporation rate: No data available.
Flammability (solid, gas): Not applicable.
Upper/lower limit on flammability or explosive limits Nonflammable
Vapor pressure: No data available.
Vapor density: 3.4 (Air=1)
Relative density: 1.15.
Solubility(ies)
 Solubility in water: water-soluble.
 Solubility (other): No data available.
Partition coefficient (n-octanol/water): No data available.
Auto-ignition temperature: No data available.
Decomposition temperature: No data available.
Viscosity: No data available.
Molecular weight: 98.08.

Section 10 - Stability and Reactivity

Reactivity: Reacts violently with strong alkaline substances.
Chemical Stability: Material is stable under normal conditions.
Possibility of Hazardous Reactions: Hazardous polymerization does not occur. Material reacts with water.
Conditions to Avoid: Moisture. Heat. Contact with incompatible materials.
Incompatible Materials: Water. Cyanides. Strong oxidizing agents. Strong reducing agents. Metals.
Halogens. Organic compounds. Potassium.
Hazardous Decomposition Products: Oxides of sul .

Section 11 - Toxicological Information

Information on likely routes of exposure

Ingestion: May cause burns of the gastrointestinal tract if swallowed.
Inhalation: May cause damage to mucous membranes in nose, throat, lungs and bronchial system.
Skin Contact: Causes severe skin burns.
Eye contact: Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product: No data available.
Dermal Product: No data available.

Inhalation

Product: No data available.

Specified substance(s): SULFURIC ACID LC 50 (Guinea pig, 8 h): 0.03 mg/l
LC 50 (Rat, 4 h): 0.375 mg/l

Repeated Dose Toxicity Product: No data available.

Skin Corrosion/Irritation Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation Product: Causes serious eye damage.

Respiratory or Skin Sensitization Product: Not a skin sensitizer.

Carcinogenicity Product: May cause cancer.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

SULFURIC ACID Overall evaluation: 1. Carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens:

SULFURIC ACID Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

No carcinogenic components identified

Germ Cell Mutagenicity

In vitro Product: No mutagenic components identified

In vivo Product: No mutagenic components identified

Reproductive Toxicity Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure Product: Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure Product: None known.

Aspiration Hazard Product: Not classified

Other Effects: No data available.

Section 12 - Ecological Information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: No data available.

Specified substance(s): SULFURIC ACID

LC 50 (Starry, european flounder (Platichthys flesus), 48 h): 100 - 330 mg/l Mortality

LC 50 (Western mosquitofish (Gambusia affinis), 96 h): 42 mg/l Mortality

LC 50 (Goldfish (Carassius auratus), 96 h): 17 mg/l Mortality

Aquatic Invertebrates

Product: No data available.

Specified substance(s): SULFURIC ACID

LC 50 (Common shrimp, sand shrimp (Crangon crangon), 48 h): 70 - 80 mg/l Mortality

LC 50 (Aesop shrimp (Pandalus montagui), 48 h): 42.5 mg/l Mortality

Chronic hazards to the aquatic environment:

Fish Product: No data available.

Aquatic Invertebrates Product: No data available.

Toxicity to Aquatic Plants Product: No data available.

Persistence and Degradability

Biodegradation Product: There are no data on the degradability of this product.

BOD/COD Ratio Product: No data available.

Bioaccumulative Potential

Bioconcentration Factor (BCF) Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow) Product: No data available.

Mobility in Soil: The product is water soluble and may spread in water systems.

Other Adverse Effects: The product contains a substance which is harmful to aquatic organisms. The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

Section 13 - Disposal Considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

Section 14 - Transport Information

DOT

UN Number: UN 2796

UN Proper Shipping Name: Sulfuric acid

Transport Hazard Class(es)

Class(es): 8

Label(s): 8

Packing Group: II

Marine Pollutant: No

IMDG

UN Number: UN 2796

UN Proper Shipping Name: SULPHURIC ACID (WITH MORE THAN 51% ACID)

Transport Hazard Class(es)

Class(es): 8

Label(s): 8

EmS No.: F-A, S-B

Packing Group: II

Marine Pollutant: No

IATA

UN Number: UN 2796

Proper Shipping Name: Sulphuric acid

Transport Hazard Class(es):

Class(es): 8

Label(s): 8

Marine Pollutant: No

Packing Group: II

Section 15 - Regulatory Information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

SULFURIC ACID Reportable quantity: 1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

X Acute (Immediate) X Chronic (Delayed) Fire Reactive Pressure Generating

SARA 302 Extremely Hazardous Substance

Chemical Identity	RQ	Threshold Planning Quantity
-------------------	----	-----------------------------

SULFURIC ACID	1000 lbs.	1000 lbs.
---------------	-----------	-----------

SARA 304 Emergency Release Notification

Chemical Identity	RQ
-------------------	----

SULFURIC ACID	1000 lbs.
---------------	-----------

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
-------------------	-----------------------------

SULFURIC ACID	500lbs
---------------	--------

SARA 313 (TRI Reporting)

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
-------------------	-------------------------------------	--

SULFURIC ACID	10000 lbs	25000 lbs.
---------------	-----------	------------

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

SULFURIC ACID Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

SULFURIC ACID Threshold quantity: 10000 lbs

US State Regulations

US. California Proposition 65

SULFURIC ACID Carcinogenic.

US. New Jersey Worker and Community Right-to-Know Act

SULFURIC ACID Listed

US. Massachusetts RTK - Substance List

SULFURIC ACID Listed

US. Pennsylvania RTK - Hazardous Substances

SULFURIC ACID Listed

US. Rhode Island RTK

SULFURIC ACID Listed

Inventory Status:

Australia AICS: On or in compliance with the inventory

Canada DSL Inventory List: On or in compliance with the inventory

EU EINECS List: On or in compliance with the inventory

EU ELINCS List: Not in compliance with the inventory.

Japan (ENCS) List: On or in compliance with the inventory
EU No Longer Polymers List: Not in compliance with the inventory.
China Inv. Existing Chemical Substances: On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI): On or in compliance with the inventory
Canada NDSL Inventory: Not in compliance with the inventory.
Philippines PICCS: On or in compliance with the inventory
US TSCA Inventory: On or in compliance with the inventory
New Zealand Inventory of Chemicals: On or in compliance with the inventory
Switzerland Consolidated Inventory: Not in compliance with the inventory.
Japan ISHL Listing: Not in compliance with the inventory.
Japan Pharmacopoeia Listing: Not in compliance with the inventory.

Section 16 - Other Information

Sources : KOSHA, National Emergency Management Agency
Issue date : 11/06/2017
Last updated date : 11/01/2019
Revision number : 1