

MATERIAL SAFETY DATA SHEET- SULPHURIC ACID

Doc No: TTP/MSDS/SA/13
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TRAVANCORE TITANIUM PRODUCTS LTD

MSDS adheres to the standards and regulatory requirements of India and may not meet the regulatory requirements in other countries

1. Chemical product and Company Information

Chemical Name: Sulphuric Acid

Other Names: Vitriol, Oil of Vitriol

Chemical Family: Inorganic compound

Formula: H₂SO₄

Molecular Weight: 98.08g/mol

Uses: Fertilizers, Textiles, TiO₂, Surface treatment and Petrochemical Industries

Manufacturer & Supplier:

Travancore Titanium Products Ltd

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2. Composition and information on ingredients

Sulphuric Acid Concentration: 95-98%

CAS No: 7664-93-9

EINECS NO: 231-639-5

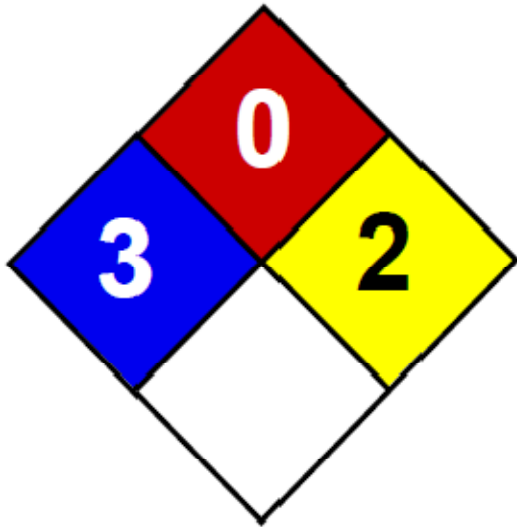
ICSC No: 0362

INRS⁽¹⁾: FTn⁰30



1

DANGER



Health	3
Fire	0
Reactivity	2
Personal Protection	

Risk Phases:

C : Corrosive

R35: causes severe burns

R34: Cause burns

R36/38: Irritating to eyes and skin

Safety phases:

S2: Keep out of the reach of children

S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S30: Never add water to this product

S45: In case of accident or if you feel unwell, seek medical advice immediately.

Hazard statement

H314: Causes severe skin burns and eye damage

H315: Causes skin irritation

H319: Causes serious eye irritation

Precautionary Statements

P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

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.

SIGNAL WORD: DANGER

3. Hazard Identification

Potential Acute Health Effects:

- ❖ Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation.
- ❖ Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract.
- ❖ Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath.
- ❖ Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.
- ❖ Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

- ❖ **CARCINOGENIC EFFECTS:** Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH.
- ❖ **MUTAGENIC EFFECTS:** Not available.
- ❖ **TERATOGENIC EFFECTS:** Not available.
- ❖ **DEVELOPMENTAL TOXICITY:** Not available.
- ❖ The substance may be toxic to kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, and teeth.
- ❖ Repeated or prolonged exposure to the substance can produce target organs damage.
- ❖ Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.
- ❖ Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.
- ❖ Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

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 15 minutes.
- ❖ Cold water may be used.
- ❖ Get medical attention immediately

Skin Contact:

- ❖ In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

- ❖ . Cover the irritated skin with an emollient.
- ❖ Cold water may be used. Wash clothing before reuse.
- ❖ Thoroughly clean shoes before reuse.
- ❖ Get medical attention immediately.

Serious Skin Contact:

- ❖ Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream.
- ❖ Seek immediate medical attention

Inhalation:

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

Serious inhalation:

- ❖ Evacuate the victim to a safe area as soon as possible.
- ❖ Loosen tight clothing such as a collar, tie, belt or waistband.
- ❖ If breathing is difficult, administer oxygen.
- ❖ If the victim is not breathing, perform mouth-to-mouth resuscitation.
- ❖ **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive.
- ❖ Seek immediate medical attention.

Ingestion:

- ❖ Do NOT induce vomiting unless directed to do so by medical personnel.
- ❖ Never give anything by mouth to an unconscious person.
- ❖ Loosen tight clothing such as a collar, tie, belt or waistband.
- ❖ Get medical attention if symptoms appear.

Most important symptoms and effects, both acute and delayed:

- ❖ The most important known symptoms and effects are described in the labeling (see section 1.3) and/or section of Toxicological information.

Serious Ingestion:

- ❖ Not available

5. Fire Fighting Measures

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion:

- ❖ Products of combustion are not available since material is non-flammable.
- ❖ However, products of decomposition include fumes of oxides of sulfur.
- ❖ Will react with water or steam to produce toxic and corrosive fumes.
- ❖ Reacts with carbonates to generate carbon dioxide gas.
- ❖ Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and Hydrogen sulfide respectively.

Fire Hazards in Presence of Various Substances: Combustible materials

Explosion Hazards in Presence of Various Substances:

- ❖ Risks of explosion of the product in presence of mechanical impact: Not available.
- ❖ Risks of explosion of the product in presence of static discharge: Not available.
- ❖ Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

- ❖ Metal acetylides (Monocesium and Monorubidium), and carbides ignite with concentrated sulfuric acid.
- ❖ White Phosphorous +boiling Sulfuric acid or its vapor ignites on contact.
- ❖ May ignite other combustible materials.

- ❖ May cause fire when sulfuric acid is mixed with Cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous (III) oxide, and oxidizing agents such as chlorates, halogens, permanganates

Special Remarks on Explosion Hazards:

- ❖ Mixtures of sulfuric acid and any of the following can explode : p- nitro toluene, pentasilver trihydroxydiaminophosphate, per chlorates, alcohols with strong hydrogen peroxide, ammonium tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro compounds, nitrates, carbides, phosphorous, iodides, pirates, fulminates, dynes, alcohols (when heated)
- ❖ Nitramide decomposes explosively on contact with concentrated sulfuric acid.
- ❖ 1, 3, 5-Trinitrosohexahydro-1, 3, 5-triazine + sulfuric acid causes explosive decomposition.

Extinguishing media

Suitable extinguishing media

- ❖ Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special hazards arising from the substance or mixture

- ❖ Sulphur oxides

Advice for firefighters

- ❖ Wear self contained breathing apparatus for firefighting if necessary.

Further Information

- ❖ No data available

6. Accidental Release Measures

Small Spill:

- ❖ Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:

- ❖ Corrosive liquid. Poisonous liquid. Stop leak if it without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapour drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution

of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Personal Precautions, protective equipment and emergency procedures

- ❖ Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe area.

Environmental precautions

- ❖ Prevent further leakage or spillage if to do so. Do not let product enter drains. Discharge into the environment must be avoided.
- ❖

Methods and materials for containment and cleaning up

- ❖ Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. Handling and Storage

Handling Precautions:

- ❖ Keep locked up. Keep container dry. Do not ingest, do not breathe gas/fumes/vapor/spray. Never add water to this product.
- ❖ In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.
- ❖ Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, combustible materials, organic materials, metals acids, alkalis, moisture.
- ❖ May corrode metallic surfaces.

Storage:

- ❖ Hygroscopic. Reacts. Violently with water. Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 23 °C (73.4 °F).

8. Exposure Controls/Personal Protection

Engineering Controls:

- ❖ Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
- ❖ Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

- ❖ Face shield, Gloves& Boots
- ❖ Full suit.
- ❖ Vapor respirator.
- ❖ Be sure to use an approved/certified respirator or equivalent.

Personal Protection in case of Large Spill:

- ❖ Splash goggles.
- ❖ Full Suit. Vapor respirator, Boots. Gloves,
- ❖ A self contained breathing apparatus should be used to avoid inhalation of the product.
- ❖ Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Control Parameters

- ❖ Components with workplace control parameters

Derived No Effect Level (DNEL)

Application area	Exposure routes	Health Effect	Value
Workers	Inhalation	Acute local effects	0.1 mg/m ³
Workers	Inhalation	Long term local effects	0.05 mg/m ³

Work Place Practices

- ❖ Label process containers.
- ❖ Provide employees with hazard information and training.
- ❖ Use engineering controls if concentrations exceed recommended exposure levels.
- ❖ Provide eye wash fountains and emergency showers.
- ❖ Wash or shower if skin comes in contact.
- ❖ Change clothing at the end of each work shift or when it may be contaminated.

9. Physical and Chemical Properties

Physical state and appearance: Liquid. (Thick oily liquid.)

Odor: Odorless, but has a choking odor when hot.

Taste: Marked acid taste. (Strong.)

Molecular Weight: 98.08 g/mole

Color: Colorless.

pH (1% soln/water): Acidic.

Boiling Point: 270°C (518°F) - 340 deg. C Decomposes at 340 deg. C

Melting Point: -35°C (-31°F) to 10.36 deg. C (93% to 100% purity)

Critical Temperature: Not available.

Specific Gravity: 1.84 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water. Sulfuric is soluble in water with liberation of much heat. Soluble in ethyl alcohol.

10. Stability and Reactivity

Stability:

- ❖ The product is stable under normal conditions of ambient temperature.

Conditions of Instability:

Conditions to Avoid:

- ❖ Incompatible materials, excess heat, combustible material materials, organic materials, exposure to moisture or water, oxidizers, amines, bases. Always add the acid to water, never the reverse.

Incompatibility with various substances:

- ❖ Reactive with oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.

Corrosivity:

- ❖ Extremely corrosive in presence of aluminum, of copper, of stainless steel (316). Highly corrosive in presence of stainless steel (304). Non-corrosive in presence of glass.

Polymerization

- ❖ Polymerization will not occur

Material to avoid:

- ❖ Vigorous reaction with water, alkaline solutions, metals, metal powder, carbides, chlorates, fulminates, nitrates, strong oxidizing, reducing or combustible organic materials. Hazardous gases are evolved on contact with chemicals such as cyanides sulfides and carbides.

11. Toxicological information

Skin contact:

- ❖ Possibility of corrosion, burns or ulcers.
- ❖ Contact with 1% solution: possibility of slight irritation, itching, redness or swelling.
- ❖ Repeated or prolonged exposure (Mist): Possibility irritation with itching burning, redness, swelling or rash

Eye contact:

- ❖ Possibility of corrosion or ulceration (Blindness may result).
- ❖ Repeated prolonged exposure (Mist): Possibility of eye irritation with tearing, pain or blurred vision.

Ingestion:

- ❖ Immediate effect of overexposure: Burns of the mouth, throat, stomach and esophagus., with severe pain, vomiting, bleeding and collapse of blood pressure. Damage may appear days after exposure.

Toxicity:

- ❖ Persons with the following pre-existing conditions warrant particular attention.
Sulphuric acid: Laryngeal irritation.

Acute Effects:

- ❖ May be fatal if inhaled or ingested large quantity
- ❖ Liquids or Acid mists: May produce tissue damage .Mucous membrane (eye, mouth, respiratory tracks).
- ❖ Extremely dangerous by eyes and skin contacts (corrosive) Severe irritant for eyes inflammation (redness, watering, itching).
- ❖ Very dangerous in case of inhalation (Mist) at high concentration: May produce severe irritation of respiratory tracks(coughing, shortness of breathing, choking)

Acute Toxicity:

- ❖ **LD50:** 2.14 mg/kg (Oral, rat)
- ❖ **LC50:** 2h- 510mg/m³ (inhalation, rat)

Skin corrosion/irritation

- ❖ **Skin:** rabbit
- ❖ **Result:** Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation

- ❖ **Eyes :** rabbit **Result :** Severe eye irritation

Respiratory or skin sensitization: No data available

Germ cell mutagenicity: No data available.

Carcinogenicity: IARC has determined that occupational exposure to strong inorganic acid mist containing sulfuric acid is carcinogenic to human.

Reproductive toxicity: No Data available

Specific target organ toxicity - single exposure: No data available

Specific target organ toxicity - repeated exposure: No data available

Aspiration hazard: No data available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. Ecological information

Ecotoxicity: Ecotoxicity in water (LC50): 49mg/l 48hrs (bluegill/sunfish)

BOD5 and COD: Not available.

Toxicity to fish (LC50): Gambusia affinis (Mosquito fish) -42 mg/l-96h

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegrading: The products of degradation are less toxic than the product itself.

Toxicity to Animals:

Toxicity to aquatic life increasing with lowering pHs. At pH lower than 5, only a few fish species can survive and at pH lower than 4, aquatic life is rare.

Mobility (Soil): Easy soil seeping under rain action.

Persistence and Degradability:

Sulfate ion: Ubiquitous in the environment. Metabolized by micro-organisms and plants.

Bioaccumulation:

Sulfate ion: Ubiquitous in the environment. Metabolized by micro-organisms and plants without bioaccumulation.

13. Disposal Considerations

Disposal Consideration

Sulfuric acid may be placed in sealed container or absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Be sure to consult with local or regional authorities (waste regulators) prior to any disposal. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transportation Information

Proper shipping Name: **Sulphuric Acid**

Class : **8 (corrosive)**

UN No: **1830**

IATA

Proper Shipping Name: **Sulphuric Acid**

Class: **8 (Corrossive)**

Packing Group: **II**

IMDG: 8

Proper Shipping Name: **Sulphuric Acid**

UN No: **1830**

Class: **8**

Packing Group: **II**

Marine Pollutant: **NO**

Special Provision (Transport): **None**

DOT (USA)/IMO (Maritime)

Proper Shipping Name: **Sulphuric Acid**

HAZARD CLASS: **8**

UN N^o: **1830**

DOT/IMO Label: **Corrosive**

Packing Group: **II**

Reportable Quantity: **1000 lbs (454kg)**

Shipping Containers: **Tank Cars, Tank Trucks, Vessel**

ERG: **GUIDE 137**

15. Regulatory Information

This product has been classified in accordance with the hazard criteria and the MSDS contains all of the information required by the Indian Factories act 1948.

TOXIC SUBSTANCES CONTROL ACT (TSCA): CAS. #: 7664-93-9 Listed in the inventory

OSHA: Hazardous Substance under 29 CFR 1210.1200

CDLHS: Under section 8 CCR 339

Index Number: 016-020-00-8

EC number: 231-639-5

WHMIS (Canada): CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC): R35- causes severe burns. S2- keeps out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S30- Never add water to this product, S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

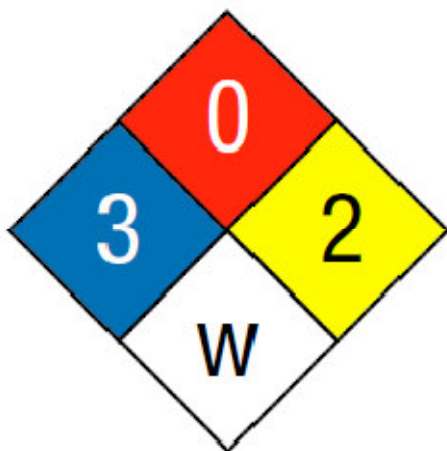
Classification HCS (U.S.A): Corrosive liquid.

CERCLA103: Hazardous Substance under 40 CFR Part 302

SARA302: extremely Hazardous substances under 40 CFR Part 355

SARA 313: Toxic chemical under 40CFR part 372.65

NFPA Ratings:



(Health Blue): 3
Flammability (Red): 0
Instability/Reactivity (Yellow): 2
Special (White): W

16. Other Information

This MSDS adheres to the standards and regulatory requirements of India, to meet the requirements as per (1) The Factories Act, 1948 and (2) Manufacture, Storage and Import of Hazardous Chemical Rules 1989, as amended through January 2000. This MSDS data sheet may not meet the regulatory requirements in other countries

The information provided in this Material 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 guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The above information relates only to the specific material(s) designated herein and may not be valid for such material(s) used in combination with any other materials or in any process or if the material is altered or processed, unless specified in the text.

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