National Company for Sulfur Products

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SULPHURIC ACID (98.5%)

COMPANY INFORMATION: NATIONAL COMPANY FOR SULPHUR PRODUCTS
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2. COMPOSITION AND INFORMATION ON INGREDIENTS

INFORMATION ON HAZARDOUS INGREDIENTS

CHEMICAL NAME: SULPHURIC ACID (98%)

MOLECULAR FORMULA: H_2SO_4

INGREDIENT	CAS NO	PERCENT	HAZARDOUS
Sulphuric Acid	7664-93-9	98.5%	C -Corrosive
Water	7732-18-5	1.5%	N-Corrosive

3. HAZARDS IDENTIFICATION

EYE CONTACT: Immediate pain, severe burns and corneal damage, which may result in permanent blindness.

SKIN CONTACT: Causes burns, and brownish or yellow stains. Concentrated solutions may cause second or third degree burns with severe necrosis. Prolonged and repeated exposure to dilute solutions may cause irritation, redness, pain and drying and cracking of the skin.

INHALATION: Causes respiratory irritation and at high concentrations may cause severe injury, burns, or death. Effects of exposure may be delayed.

INGESTION: Causes severe irritation or burns of the mouth, throat, and esophagus. Existing Medical Conditions Possibly Aggravated By 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.

CARCINOGENICITY: Strong inorganic acid mists containing sulfuric acid Occupational exposures): Proven (Human, Group 1, IARC); Suspected (Human

Group A2, ACGIH) ; Group 3 (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

4.FIRST AID MEASURES

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.

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.

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.

INGESTED: 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 centre. Vomiting may need to be induced but should be directed by a physician or a poison control centre. Immediately transport victim to an emergency facility.

NOTE TO PHYSICIANS: This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Following exposure the patient should be kept under medical review for at least 48 hours as delayed pneumonitis

may occur. Do not attempt to neutralize the acid with weak bases since the reaction will produce heat that may extend the corrosive injury

5. FIRE AND EXPLOSION DATA

FLASH POINT (METHOD):	Not applicable. Not combustible.
FLAMMABLE LIMITS (LOWER):	Not applicable.
FLAMMABLE LIMITS (UPPER):	Not applicable.
AUTO IGNITION TEMPERATURE:	Not applicable.
COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS:	Oxides of Sulfur.
FIRE AND EXPLOSION HAZARDS:	Not flammable but highly reactive. Strong dehydrating agent, which may cause ignition of finely divided combustible materials on contact. Reacts violently with water with evolution of heat can react with organic materials explosively (See Section 10). Reacts with many metals to liberate hydrogen gas which can form explosive mixtures with air. Hydrogen a highly flammable gas can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. Oxides of sulfur may be produced in fire.
FIRE FIGHTING INSTRUCTIONS:	Wear a NIOSH 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 personnel to a safe area. 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.
NOTE:	Also see "Section 10 - Stability and Reactivity.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:	Remove all ignition sources (no smoking, flares, sparks or flames). Ventilate area. Use appropriate Personal Protection Equipment. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Stop or reduce leak if safe to do so.

EVACUATION: Isolate spill or leak area immediately for at least 50 to 100 meters (160 to 330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate enclosed areas.

SMALL SPILLS: 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 SPILLS: 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 in situ neutralization and disposal. Anhydrous sodium sulfate is useful to treat spills of sulphuric acid. It reacts with the liquid to contain and solidify the spill and suppress the fume. Ensure adequate decontamination of tools and equipment following clean up. Comply with Federal, Provincial/State and local regulations on reporting releases.

WASTE DISPOSAL METHODS: Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.

NOTE: Clean-up material may be a RCRA Hazardous Waste on disposal.
Spills are subject to CERCLA reporting requirements: RQ = 1000 lbs.

7. HANDLING AND STORAGE

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. Locate safety shower and eyewash station close to chemical handling area. Use extreme care when diluting with water. Always add acid to water.

CAUTION: Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. Carbon steel storage tanks must be vented. People working with this chemical should be properly trained regarding its hazards and its safe use.

STORAGE: If stored in non-reactive container, keep container tightly closed. Metal and, specifically carbon steel, storage tanks must be vented due to hydrogen release as noted above.

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. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

PERSONAL PROTECTION IN CASE OF A 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.

EXPOSURE LIMITS: TWA: 1 STEL: 3 (mg/m3) [Australia] Inhalation.
TWA: 1 (mg/m3) from OSHA (PEL) [United States] Inhalation.
TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation.
TWA: 1 (mg/m3) from NIOSH [United States] Inhalation.
TWA: 1 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

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. COEFFICIENT: 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 DATA

STABILITY: The product is stable.

INSTABILITY TEMPERATURE: Not available.

CONDITIONS OF INSTABILITY: Conditions to avoid incompatible materials, excess heat, combustible material materials, organic materials, exposure to moist air 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.

SPECIAL REMARKS ON REACTIVITY: Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product.Incompatible (can react explosively or dangerously) with the following: Acetic acid, Acrylic acid, Ammonium hydroxide, Cresol, Cumene, Dichloroethyl ether, Ethylene Cyanohydrin,Ethyleneimine, Nitric acid, 2-Nitropropane, Propylene oxide, Sulfolane, Vinylidene chloride, Diethylene glycolmonomethyl ether, Ethyl acetate, Ethylene cyanohydrin, Ethylene glycol monoethyl ether acetate, Glyoxal, Methyl ethyl ketonE, Dehydrating agents, Organic materials, Moisture (water), Acetic anhydride, Acetone, cyanohydrin, Acetone+nitric acid, Acetone + potassium dichromate, Acetonitrile, Acrolein, Acrylonitrile, Acrylonitrile +water, Alcohols + hydrogen peroxide, ally compounds such as Allyl alcohol, and Allyl Chloride, 2-Aminoethanol, Ammonium hydroxide, Ammonium triperchromate, Aniline, Bromate + metals, Bromine pentafluoride, n-Butyraldehyde, Carbides, Cesium acetylene carbide, Chlorates, Cyclopentanone oxime, chlorinates, Chlorates + metals, Chlorine trifluoride, Chlorosulfonic acid, 2-Cyano-4-Nitrobenzenediazonium hydrogen sulfate, Cuprous nitride, p-Chloronitrobenzene, 1,5- Dinitronaphthlene + sulfur, Diisobutylene, p-dimethylaminobenzaldehyde, 1,3-Diazidobenzene, Dimethylbenzylcarbinol + hydrogen peroxide, Epichlorohydrin, Ethyl alcohol + hydrogen peroxide, Ethylene diamine, Ethylene glycol and other glycols, , Ethylenimine, Fulminates, hydrogen peroxide, Hydrochloric acid, Hydrofluoric acid, Iodine heptafluoride, Indane + nitric acid, Iron, Isoprene,Lithium silicide, Mercuric nitride, Mesityl oxide, Mercury nitride, Metals (powdered), Nitromethane, Nitric acid + glycerides, p-Nitrotoluene, Pentasilver trihydroxydiaminophosphate, Perchlorates, Perchloric acid, Permanganates + benzene, 1- Phenyl-2-methylpropyl alcohol + hydrogen peroxide, Phosphorus, Phosphorus isocyanate, Picrates, Potassium tert-butoxide, Potassium chlorate, Potassium Permanganate and other permanganates, halogens, amines, Potassium Permanganate +Potassium chloride, Potassium Permanganate + water, Propiolactone (beta)-, Pyridine, Rubidium aceteylene carbide, Silver permanganate, Sodium, Sodium carbonate, sodium hydroxide, Steel, styrene monomer, toluene + nitric acid, Vinyl acetate, Thalium (I) azidodithiocarbonate, Zinc chlorate, Zinc Iodide, azides, carbonates, cyanides, sulfides, sulfites, alkali hydrides, carboxylic acid anhydrides, nitriles, olefinic organics, aqueous acids, cyclopentadiene, cyano-alcohols, metal acetylides. Hydrogen gas is generated by the action of the acid on most metals (i.e. lead, copper, tin, zinc, aluminum, etc.). Concentrated sulfuric acid oxidizes, dehydrates, or sulfonates most organic compounds.

SPECIAL REMARKS ON CORROSIVITY: Non-corrosive to lead and mild steel, but dillute acid attacks most metals. Attacks many metals releasing hydrogen. Minor corrosive effect on bronze. No corrosion data on brass or zinc.

POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

ROUTES OF ENTRY: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

TOXICITY TO ANIMALS
WARNING: The IC50 values hereunder are estimated on the basis of a 4-hour exposure. Acute oral toxicity LD50): 2140 mg/kg [Rat.]. Acute toxicity of the vapor (LC50): 320 mg/m3 2 hours [Mouse].

CHRONIC EFFECTS ON HUMANS
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH. May cause damage to the following organs: kidneys, lungs, heart, cardiovascular system, upper respiratory tract, eyes, teeth.

OTHER TOXIC EFFECTS ON HUMANS: Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion. Special Remarks on Toxicity to Animals: Not available.

SPECIAL REMARKS ON CHRONIC EFFECTS ON HUMANS
MUTAGENICITY: Cytogenetic Analysis: Hamster, ovary = 4mmol/L Reproductive effects: May cause adverse reproductive effects based on animal data. Developmental abnormalities (musculoskeletal) in rabbits at a dose of 20 mg/m3 for 7 hrs.(RTECS)

TERATOGENECITY: Neither embryotoxic, fetoxic, nor teratogenetic in mice or rabbits at inhaled doses producing some maternal toxicity.

SPECIAL REMARKS ON OTHER TOXIC EFFECTS ON HUMANS
ACUTE POTENTIAL HEALTH EFFECTS:
SKIN: Causes severe skin irritation and burns. Continued contact can cause tissue necrosis.

EYE:
Causes severe eye irritation and burns, may cause irreversible eye injury.

INGESTION: Harmful if swallowed, may cause permanent damage to the digestive tract. Causes gastrointestial tract burns. May cause perforation of the stomach, GI bleeding, edema of the glottis, necrosis and scarring, and sudden circulatory collapse(similar to acute inhalation). It may also cause systemic toxicity with acidosis.

INHALATION: May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Cause corrosive action on mucous membranes. May affect cardiovascular

system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death, may also affect teeth (changes in teeth and supporting structures - erosion, discoloration). Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect behavior (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (ischemic heart lesions), and respiratory system/lungs (pulmonary edema, lung damage), teeth (dental discoloration, erosion).

SKIN: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

12. ECOLOGICAL INFORMATION

ECOTOXICITY: Ecotoxicity in water (LC50): 49 mg/l 48 hours [bluegill/sunfish].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

TOXICITY OF THE PRODUCTS OF BIODEGRADATION: The products of degradation are less toxic than the product itself. Special Remarks on the Products of Biodegradation: Not available.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: 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. TRANSPORT INFORMATION

U.S. (UNDER DOT)
SHIPPING NAME: Sulphuric acid
CLASSIFICATION(S): Class 8 (6.1)
PRODUCT IDENTIFICATION NO. (PIN): UN 1830
PACKING GROUP: II

CANADA (UNDER TDG)
SHIPPING NAME: Sulphuric acid
HAZARD CLASS OR DIVISION: 8

PRODUCT IDENTIFICATION NO. (PIN): UN 1830
PACKING GROUP: II
LABEL(S): 8 (Corrosive)

RQ: 1000 pounds (454 kg)

15. OTHER REGULATORY INFORMATION

FEDERAL AND STATE REGULATIONS: Illinois toxic substances disclosure to employee act: Sulfuric acid New York release reporting list: Sulfuric acid Rhode Island RTK hazardous substances: Sulfuric acid Pennsylvania RTK: Sulfuric acid Minnesota: Sulfuric acid Massachusetts RTK: Sulfuric acid New Jersey: Sulfuric acid California Director's List of Hazardous Substances (8 CCR 339): Sulfuric acid Tennessee RTK: Sulfuric acid TSCA 8(b) inventory: Sulfuric acid SARA 302/304/311/312 extremely hazardous substances: Sulfuric acid SARA 313 toxic chemical notification and release reporting: Sulfuric acid CERCLA: Hazardous substances. Sulfuric acid: 1000 lbs. (453.6 kg)

OTHER REGULATIONS: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

OTHER CLASSIFICATIONS
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- 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 (show the label where possible).

HMIS (U.S.A.)
HEALTH HAZARD: 3
FIRE HAZARD: 0
REACTIVITY: 2
PERSONAL PROTECTION
NATIONAL FIRE PROTECTION ASSOCIATION (U.S.A)
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 2
SPECIFIC HAZARD
PROTECTIVE EQUIPMENT: Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

16. OTHER INFORMATION

DATE OF FIRST ISSUE:	11-10-2011
DATE OF PREVIOUS MSDS:	N.A.
DATE OF ISSUE:	11-10-2014
VERSION:	1
MSDS PREPARED BY:	QC&QA Senior Chemist
AUTHORIZED BY:	QC&QA Manager