

NITRIC



COLUMBUS CHEMICAL INDUSTRIES INC.

N4335 TEMKIN ROAD
COLUMBUS, WISCONSIN 53925
(414) 623-2140
FAX (414) 623-2577

MATERIAL SAFETY DATA SHEET

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC. I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

I. PRODUCT IDENTIFICATION

REVISION NO : 3
REVISION DATE : 1/01/91
PRODUCT CODE
FILE NUMBER
PRODUCT NAME: NITRIC ACID
SYNONYMS: Aqua fortis, azotic acid, hydrogen nitrate
CHEMICAL FAMILY: Inorganic acid
FORMULA: HNO₃
DESCRIPTION: Acid
OSHA HAZARD CLASSIFICATION: Oxidizer, corrosive, skin and eye hazard, lung toxin

II. COMPONENT DATA

PRODUCT COMPOSITION

CAS or CHEMICAL NAME: Nitric acid
CAS NUMBER: 7697-37-2
PERCENTAGE RANGE: 60-71%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)		ACGIH (TLV)		OLIN
	ppm	mg/cubic-meter	ppm	mg/cubic-meter	ppm mg/cubic-meter
TWA:	2	5	2	5	None Established
CEILING:	None Established		None Established		None Established
STEL:	4	10	4	10	None Established

CAS or CHEMICAL NAME: Water
CAS NUMBER: 7732-18-5
PERCENTAGE RANGE: 29-40%
HAZARDOUS PER 29 CFR 1910.1200: No
EXPOSURE STANDARDS: None established

PACKAGERS / PROCESSORS OF REAGENT CHEMICALS
ACIDS SOLVENTS INORGANIC SALTS PREPARED SOLUTIONS

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WAS OFF WITH WATER.

STORAGE CONDITIONS: Store in a cool, dry, well-ventilated area.

DO NOT STORE AT TEMPERATURES ABOVE: 38 Deg.C (100 Deg.F)

DO NOT EXPOSE TO DIRECT LIGHT.

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS: 1 YEAR

INCOMPATIBLE MATERIALS FOR PACKAGING: Polyethylene bottles, metal containers

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: Refer to Incompatible Materials, Section VII.

IV. PHYSICAL DATA

APPEARANCE: Colorless to slightly yellow liquid

FREEZING POINT: -22 to -41 Deg.C (-7.6 to -42 Deg.F)

BOILING POINT: 120 to 122 Deg.C (248 to 252 Deg.F)

DECOMPOSITION TEMPERATURE: No Data

SPECIFIC GRAVITY: 1.37 - 1.42

BULK DENSITY: 1.37 - 1.42 (g/cc)

pH @ 25 DEG.C: < 1 (1% solution)

VAPOR PRESSURE @ 25 DEG.C: 49 to 55 mmHg

SOLUBILITY IN WATER: Complete

VOLATILES, PERCENT BY VOLUME: 100%

EVAPORATION RATE: No Data

VAPOR DENSITY: No Data

MOLECULAR WEIGHT: 63.01 (active ingredient)

ODOR: Irritating, suffocating

COEFFICIENT OF OIL/WATER DISTRIBUTION: No Data

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION: Wear a NIOSH/MSHA approved respirator if any exposure occurs.

VENTILATION: Use local exhaust ventilation to maintain levels to below the TLV.

SKIN PROTECTION: Wear gloves, boots, apron and a face shield with safety glasses. A full impermeable suit is recommended if exposure is possible to large portion of body.

EQUIPMENT SPECIFICATIONS:

RESPIRATOR TYPE: NIOSH/MSHA approved acid gas full facepiece respirator

GLOVE TYPE: Neoprene

BOOT TYPE: Neoprene

APRON TYPE: Neoprene

PROTECTIVE SUIT: Neoprene

OTHER: Emergency shower/eye wash station

VI. FIRE AND EXPLOSION HAZARD INFORMATION

FLAMMABILITY DATA:

FLAMMABLE: No
COMBUSTIBLE: No
PYROPHORIC: No
FLASH POINT: None
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): Not Applicable

NFPA RATINGS:

Health: 3
Flammability: 0
Reactivity: 1
Special Hazard Warning: OXIDIZER

HMS RATINGS:

Health: 3
Flammability: 0
Reactivity: 1

EXTINGUISHING MEDIA: Not Applicable

FIRE FIGHTING TECHNIQUES AND COMMENTS: Use water to cool containers exposed to fire. See Section XI for protective equipment for fire fighting. Use water in flooding quantities as fog. This material is non-combustible but may ignite or react with many substances. See Section VII.

VII. REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE

TEMPERATURES ABOVE: No Data
MECHANICAL SHOCK OR IMPACT: No
ELECTRICAL (STATIC) DISCHARGE: No
HAZARDOUS POLYMERIZATION: Will Not Occur
INCOMPATIBLE MATERIALS: Reacts with a wide variety of metals (especially when powdered), bases, carbides, sulfides, fulminates, picrates, chlorates; oxidizable inorganic compounds, organic chemicals, turpentine, and combustible materials.
HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, hydrogen gas
OTHER CONDITIONS TO AVOID: Heat and light

SUMMARY OF REACTIVITY:

OXIDIZER: Yes
PYROPHORIC: No
ORGANIC PEROXIDE: No
WATER REACTIVE: No
CORROSIVE: Yes

VIII. FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

SKIN: Immediately flush with water for at least 15 minutes. Call a physician. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use.

INGESTION: Immediately drink large quantities of water. DO NOT induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.

INHALATION: If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Call a physician. In the event that an individual inhales enough vapor to lose consciousness, person should be moved to fresh air at once and a physician should be called immediately. If breathing has stopped, artificial respiration should be given immediately. In all cases, ensure adequate ventilation and provide respiratory protection before the person returns to work.

NOTE TO PHYSICIAN: Delayed pulmonary edema may occur.

IX. TOXICOLOGY AND HEALTH INFORMATION

ROUTES OF ABSORPTION

Oral, Dermal, Inhalation, Eye Contact

WARNING STATEMENTS AND WARNING PROPERTIES

CORROSIVE TO ALL TISSUES CONTACTED.
MAY BE FATAL IF SWALLOWED.
HARMFUL IF INHALED.

HUMAN DOSE RESPONSE DATA

ODOR AND IRRITATION THRESHOLD: There is no data available on the odor or irritation threshold to this compound.

If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly.

As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by treatment.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT: This substance is listed on the Toxic Substances Control Act inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT TITLE III:

HAZARD CATEGORIES, PER 40 CFR 370.2:

HEALTH: Immediate (Acute), Delayed (Chronic)

PHYSICAL: Fire

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:

EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:

1,000 lbs

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:

This mixture or tradename product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

CHEMICALS LISTED ARE: Nitric acid

XIV. ADDITIONAL INFORMATION

No Additional Information

Air Release - vapors may be suppressed by the use of a water fog.

All water must be contained and treated as a hazardous waste and/or neutralized. Note, however, the reactivity nature of this product with water.

Water Release - This material is heavier than water. This material is soluble in water.

Notify all downstream municipal, public, or industrial water users of possible contamination. Create an earthen dike to contain the material if at all possible and treat as necessary.

Land Spill - Compatible absorbents: Sand, clay soil, commercial absorbents, cement powders

Create a dike or containment area using earth, clay, sand, etc. Do not use items such as saw dust or wood based absorbents. Dig a trench or pocket to contain the material if necessary and treat/neutralize as soon as possible. Neutralization may include the use of lime. Be sure to check local environmental regulations prior to this procedure.

SPILL RESIDUES: Dispose of per guidelines under Section XII, WASTE DISPOSAL. This material may be neutralized for disposal

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS: Response to this material may require the use of a full encapsulated suit and self-contained breathing apparatus (SCBA). Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, gloves (see below for compatible materials), hard hat, splash-proof goggles, full face shield and impervious clothing, i.e., chemically impervious suit.

Compatible materials for response to this material are Neoprene, Polyvinyl chloride, Butyl Rubber and Viton.

Protection concerns must also address the potential of the physical characteristics of this product as follows:

- a) Contact with most metals may produce flammable and potentially explosive gases.
- b) Poison-By inhalation
- c) Combustion upon contact with non-compatible materials such as wood or wood based products.

XII. WASTE DISPOSAL

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D001, D002.

TOXIC DOSE AND EFFECT: Most of the human data is on the corrosive action of this material to the skin and from inhaling large quantities of this material. The concentrations at which these have occurred has not been well reported.
IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: The IDLH for nitric acid is 100 ppm.

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE

INHALATION:

ACUTE: Inhalation of nitric acid mist is severely irritating to the mucous membranes and respiratory tract, the effects of which may not show immediately after exposure. Signs exhibited after inhalation may include dryness in the throat and nose, cough, choking, chest pain and shortness of breath. In some individuals, similar or more severe signs may be observed after a latent period of several hours following inhalation. These severe effects may be a bronchopneumonia, severe shortness of breath and/or pulmonary edema. Severe exposures have been reported to cause tooth erosion, although these reports are complicated by exposure to multiple acids.

CHRONIC: Repeated inhalation at exposure levels greater than currently accepted limits may cause chronic bronchitis and/or chemical pneumonitis.

SKIN:

ACUTE: Direct contact with the liquid is corrosive, producing immediate burns with skin destruction and possible ulceration. A yellow-brown discoloration may appear from contact with dilute and concentrated solutions. High mist concentrations may cause irritation of the skin and possibly burns, along with yellow discoloration of the skin.

CHRONIC: There is no information available on chronic exposure by this route. Chronic dermal contact with significant amounts of the acid is unlikely because of the corrosive nature of the product.

EYE:

ACUTE: Direct contact with the eye will cause an immediate corrosive action with burns to the cornea and conjunctival epithelia. Permanent eye damage and impairment of vision may result. High mist concentrations may cause mild to severe eye irritation, and in extreme cases, be corrosive to the eye.

INGESTION:

ACUTE: Ingestion may cause burns to the mouth, throat and stomach, and gastroenteritis with any or all of the following symptoms: Nausea, vomiting, lethargy, diarrhea, bleeding or ulceration, and may be fatal.

CHRONIC: There is no data available on the chronic ingestion of nitric acid. Chronic ingestion of significant amounts of nitric acid is unlikely because of its acute corrosive action.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Asthma, emphysema, and other respiratory diseases

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:

Oxides of nitrogen which may evolve from fuming nitric acid may enhance the respiratory effects of nitric acid.

ANIMAL TOXICOLOGY

ACUTE TOXICITY

Oral LD 50: No available data
Dermal LD 50: No available data
Inhalation LC 50: 2500 ppm/1 hour (rat)

AQUATIC TOXICITY

The aquatic toxicity of nitric acid is related to the pH of the water which it achieves. For rainbow trout, the reported LC 50 is about a pH of 4.0 for a 7 day bioassay. Other reported aquatic toxicity data show TLM values of 180 ppm for the shore crab, 100-330 ppm for the starfish and armed bullhead, and 330-1000 ppm for the cockle.

ACUTE AND CHRONIC TARGET ORGAN EFFECTS IN LABORATORY ANIMALS

Studies of acute and repeated exposures to nitric acid in laboratory animals have shown the lung to be the target organ of toxicity. Repeated inhalation of high concentrations of nitric acid by dogs produced chronic inflammation, pulmonary resistance and airway obstruction. Hamsters exposed by inhalation of nitric acid into the trachea showed acute bronchitis, decreased lung volume and increases in lung weight.

DEVELOPMENTAL AND REPRODUCTIVE TOXICITY

There are no known or reported effects on fetal development or reproduction from nitric acid exposure in humans. In the literature, there are unsubstantiated reports on developmental and reproductive effects in laboratory animals; however, these studies were not performed according to accepted protocols or practices.

CARCINOGENICITY:

Nitric acid is not classified as a carcinogen by OSHA, IARC, NTP, EPA or any other authority.

MUTAGENICITY:

There are no known or reported studies on the mutagenicity of nitric acid.

X. TRANSPORTATION INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT DESCRIPTION FROM THE HAZARDOUS MATERIALS TABLE 49 CFR 172.101:
Nitric Acid, OXIDIZER, UN 2031

REPORTABLE QUANTITY: 1000 lbs. (Per 49 CFR 172.101, Appendix)

The material described above is subject to the U.S. DOT HAZARDOUS MATERIALS REGULATIONS via the modes and packaging quantities indicated below with the letter "x":

MODE	PACKAGING QUANTITIES	
<input checked="" type="checkbox"/> Rail	<input checked="" type="checkbox"/> Bulk	<input checked="" type="checkbox"/> Non-Bulk
<input checked="" type="checkbox"/> Motor	<input checked="" type="checkbox"/> Bulk	<input checked="" type="checkbox"/> Non-Bulk
<input checked="" type="checkbox"/> Water	<input checked="" type="checkbox"/> Bulk	<input checked="" type="checkbox"/> Non-Bulk
<input checked="" type="checkbox"/> Air	<input checked="" type="checkbox"/> Bulk	<input checked="" type="checkbox"/> Non-Bulk

The applicable packaging section in 49 CFR is 173.268.

DOT EMERGENCY GUIDE NUMBER: 44

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.
REPORTABLE QUANTITY: 1000 LBS as 100% NITRIC ACID (Per 40 CFR 302.4)

SPILL MITIGATION PROCEDURES: Hazardous concentrations in air may be found in local spill area and immediately downwind. Remove all sources of ignition.

Stop source of spill if it may be done safely. Evacuate the immediate area and mark off accordingly but only after obtaining the proper personnel protective equipment.