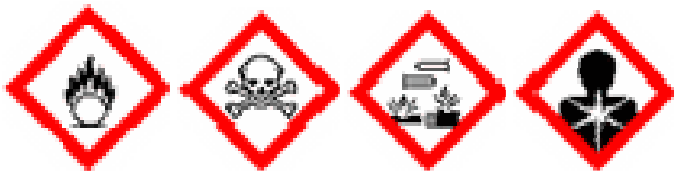
A MEMBER OF HMS GROUP, UK

MSDS	Material Safety Data Sheet

NITRIC ACID

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY	
PRODUCT NAME	Nitric acid
RECOMMENDED USE & RESTRICTIONS ON USE	Research use only
INFORMATION OF MANUFACTURER/IMPORTER/SUPPLIER	
COMPANY	
ADDRESS	
EMERGENCY PHONE	
E—MAIL ADDRESS	

2. HAZARDS IDENTIFICATION		
GHS CLASSIFICATION	Oxidizing liquids Oxidizing solids: Category 3 Skin corrosion/irritation: Category 1A Serious eye damage/eye irritation: Category 1 Acute toxicity-Inhalation: Category 2 Specific target organ systemic toxicity Single exposure: Category 1 <respiratory organ> Specific target organ systemic toxicity Repeated exposure: Category 1 <teeth><respiratory organ> Aspiration toxicity: Category 1	
LABEL ELEMENTS	PICTOGRAM	
	HAZARD SYMBOL	DANGER
	HAZARD STATEMENTS	May intensify fire; oxidizer Causes severe skin burns and eye damage Causes serious eye damage Fatal if inhaled Causes damage to organs <respiratory organ>

		Causes damage to organs through prolonged or repeated exposure <teeth><respiratory organ> May be fatal if swallowed and enters airways
	PRECAUTIONARY STATEMENTS	Do not breathe fume/gas/mist/vapours. Do not eat, drink or smoke when using this product. Keep away from heat. Take any precaution to avoid mixing with combustibles. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Get medical attention/advice if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Wash contaminated clothing before reuse. Store container tightly closed in well-ventilated place. Store locked up. Dispose of contents/container to a located point in accordance with local/regional/national/international regulation.
OTHER HAZARDS (NFPA 704	Health	3
	Fire	0
	Reactivity	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMILCAL IDENTITY	SYNONYMS	CAS NUMBER	ASSAY
Nitric acid	Azotic acid; Hydrogen nitrate	7697-37-2	Above 70 %

4. FIRST AID MEASURES	
GENERAL ADVICE	Wash off immediately with soap and plenty of water. In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit. Use personal protective equipment.
IN CASE OF EYE CONTACT	Remove any contact lenses at once. Flush eyes well with flooding amounts of running water for at least 15 minutes. Assure adequate flushing by separating the eyelids with sterile fingers. If irritation persists, transport to a hospital immediately.
IN CASE OF SKIN CONTACT	Remove contaminated clothes and shoes, rinse skin with plenty of water or shower. Use soap to help assure removal. If irritation persists, transport to a hospital immediately.
IF INHALED	Move victim to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, administer artificial respiration. Maintain normal body temperature with a blanket. If irritation persists, transport to a hospital immediately.
IF SWALLOWED	Rinse mouth, give plenty of water to dilute the substance. Do not induce vomiting. Never give anything by mouth to an unconscious person. Transport to a hospital immediately.

5. FIRE FIGHTING MEASURES	
EXTINGUISHING MEDIA	Not combustible. Use extinguishing media appropriate to the surrounding fire. Carbon dioxide, dry chemical powder, water
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	Toxic, irritating fumes or smoke may be emitted. Strong oxidizer. Contact with combustible materials may cause fire.
SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:	Firemen should wear normal protective equipment(full bunker gear)and positive-pressure self-contained

	breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS	Remove ignition sources and ventilate the area. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin and eyes.
ENVIRONMENTAL PRECAUTIONS	Prevent spills from entering sewers, watercourses or low areas.
METHODS FOR CLEANING UP	Do not touch spilled material without suitable protection(See Section 8). Take up spilled material with ashes or other incombustible absorbents and put all wastes in a bag for disposal. Cover and mix the rest with a reducing agent such as hyposolution, and neutralize with soda ash aqueous solution, take up and put in other bags for disposal. After material is completely picked up, wash the spill site with soap and water and ventilate the area. Remove, clean, or dispose of contaminated clothing.

7. HANDLING AND STORAG

PRECAUTION FOR SAFE HANDLING	Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Handle material with suitable protection.
CONDITIONS FOR SAFE STORAGE	Store away from sunlight in well-ventilated dry place at room temperature (preferably cool place). Keep container tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE STANDARDS	OSHA	No data
	ACGIH	No data
APPROPRIATE ENGINEERING CONTROLS:		Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
INDIVIDUAL PROTECTION MEASURES	RESPIRATORY PROTECTION	Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges

		as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
	EYE PROTECTION	Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
	SKIN PROTECTION	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
	BODY PROTECTION	Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	FORM	Liquid
	COLOR	Colorless
ODOUR		No data available
ODORODOUR THRESHOLD VALUE		No data available
pH		< 1.0
FREEZING POINT :		No data available
INITIAL BOILING POINT		120.5 ℃
FLASH POINT		Noncombustible
EVAPORATING RATE		No data available

FLAMMABILITY(solid, gas)		No data available
EXPLOSIVE LIMITS		No data available
VAPOR PRESSURE		49 hPa at 50 ℃
SOLUBILITY IN	WATER	Insoluble
VAPOR DENSITY		No data available
RELATIVE DENSITY		1,413 g/cm3 at 20 ℃
PARTITION COEFFICIENT: N-OCTANOL/WATER		No data available
AUTOIGNITION TEMPERATURE		No data available
DECOMPOSITION TEMPERATURE		No data available
VISCOSITY		No data available
MOLECULAR WEIGHT		63.01

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY & POSSIBILITY OF HAZARDOUS REACTIONS	Stable under recommended storage conditions.
CONDITIONS TO AVOID	Sunlight, heat
INCOMPATIBILE MATERIALS	Reducing agents, alkalis, metals, organic compounds, organic materials, amines
HAZARDOUS DECOMPOSITION PRODUCTS	Nitrogen oxides may be formed.

11. TOXICOLOGICAL INFORMATION

HEALTH HAZARD INFORMATION	ACUTE TOXICITY	LDLo(orl,human): 430 mg/kg (YAKUD5 22,651,1980) LC50(ihl,rat): 130mg/m3/4H(VCVN5* -, 45, 1993) TDLo(skin,rat): 150mL/kg(VCVN5* -, 45, 1993)
	SKIN CORROSION/ SKIN IRRITATION	Corrosive. Serious skin burns. Pain. (ICSC, 1994) and (HSDB, 2005)
	EYE DAMAGE/ EYE IRRITATION	No data available
	RESPIRATORY SENSITIZATION	No data available
	SKIN SENSITIZATION	No data available
	CARCINOGENICITY	No data available

	GERM CELL MUTAGENICITY	Sister chromatied exchange; hamster; ovary; 400nmol/L(ENMUDM 7, 381, 1985)
	TOXIC TO REPRODUCTION	No data available
	SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE	Human; upper respiratory trac irritation, coughing, dyspnea, breast pung(ACGHIH, 2001), (DFGOT, vol 3, 1991), (ICSC(J), 1994), (HSDB, 2005)
	SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE	Human; chronic bronchitis(ACGIH, 2001), teeth erosion(ACGIH, 2001), (DFGOT vol 3, 1994)
	ASPIRATION HAZARD	Human; chemical lobar pneumonia(ACGIH, 2001)

12. ECOLOGICAL INFORMATION

ECOTOXICITY	TO FISH	No data available
	TO CRUSTACEA	No data available
	TO OTHER AQUATIC LIFE	No data available
PERSISTENCE/ DEGRADABILITY	PERSISTENCE	No data available
	DEGRADABILITY	No data available
BIOACCUMULATION POTENTIAL	ACCUMUKATION	No data available
	BIODEGRADABILITY	No data available
MOBILITY IN SOIL		No data available
OTHER ADVERSE EFFECTS		No data available

13. DISPOSAL CONSIDERATION

DISPOSAL METHODS	Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.
DISPOSAL CONSIDERATIONS	Dispose of this material and its container in accordance with local/regional/national/international regulation.

14. TRANSPORT INFORMATION	
UN NUMBER	UN 2031
UN PROPER SHIPPING NAME	Nitric acid
TRANSPORT HAZARD CLASS	Class 8
PACKING GROUP	I
MARINE POLLUTANT	No data
SPECIAL PRECAUTIONS FOR USER	
IN CASE OF FIRE	F-A
IN CASE OF LEAK	S-Q

15. REGULATORY INFORMATION		
Occupational Safety and Health Act		Measurement material about exposure(Period:6 month) Controlled Hazard substances Special medical examination Chemicals (Period:12month) Exposure standard establishment material
Toxic Chemicals Control Act		Accident Preparation Chemicals Toxic Chemicals
Safety Control of Dangerous Substance Act		listed
Wastes Control Act		listed
Persistent Organic Pollutants Control Act		Not listed
US REGULATIONS	OSHA	Not listed
	CERCLA	Not listed
	EPCRA302	Not listed
	EPCRA304	Not listed
	EPCRA313	Not listed
	ROTTERDAM CONVENTION	Not listed
	STOCKHOLM CONVENTION	Not listed
	MONTREAL PROTOCOL	Not listed

EU CLASSIFICATION INFORMATION	CLASSIFICATION	O; R8 C; R35
	RISK PHRASES	R8, R35
	SAFETY PHRASES	S1/2, S23, S26, S36, S45

16. OTHER INFORMATION

REFERENCES AND SOURCES FOR DATA	Wako Corporation Sigma-Aldrich Corporation
ORIGINATED DATE	2012. 6. 5
REVISION NUMBER AND DATE	Revision number: 0 Final revision data: 2012. 6. 5
OTHER	The information in this MSDS is based on several references and the present state of our knowledge. However, the MSDE dose not always cover all information about product. The information in this MSDS is only provision of information, and It does not represent any guarantee of the properties of the product.