Issue date: 9/24/2003
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Safety Data Sheet

1. Chemical product and company identification

Product name	:	Formic acid, 98%

Company information

Name of manufacturer	:	KANTO CHEMICAL CO., INC.
Address	:	2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP
Name of section	:	Business Administration Department, Reagent Division
Telephone number	:	+81-3-6214-1090
Facsimile number	:	+81-3-3241-1047
Mail address	:	BC32@kanto.co.jp
Reference No	:	16233
Product numbers applied by the SDS	:	16233, 16292
Recommended use	:	For research use only
Restrictions on use	:	Seek expert judgment when using the product for applications other than those recommended.

2. Hazards identification

GHS classification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity (oral)	Category 4
	Acute toxicity (inhalation:vapors)	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity (single exposure)	Category 1 (central nervous sustem, respiratory organs, blood, kidney)
	Specific target organ toxicity (repeated exposure)	Category 2 (respiratory organs)
Environmental hazards	Aquatic acute	Category 3

Hazard pictograms

Signal word	:	Danger

Hazard statements	:	Flammable liquid and vapor Harmful if swallowed or if inhaled Causes severe skin burns and eye damage Causes damage to organs (central nervous sustem, respiratory organs, blood, kidney) May cause damage to organs (respiratory organs) through prolonged or repeated exposure Harmful to aquatic life

Precautionary statements

Prevention	:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take action to prevent static discharges. Do not breathe mist/vapors. Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	:	IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. IF SWALLOWED: Rinse mouth. Do not induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water . IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Call a POISON CENTER or doctor. Immediately call a POISON CENTER or doctor. Call a POISON CENTER or doctor if you feel unwell. Get medical advice/attention if you feel unwell. Rinse mouth.
Storage	:	Store in a well-ventilated place. Keep cool. Store locked up.
Disposal	:	Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

3. Composition/information on ingredients

Distinction of substance or mixture : Substance

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Formic acid	≥ 98	HCOOH	Listed	200-579-1	64-18-6

4. First aid measures

First aid measures

First-aid measures after inhalation	:	Remove the victim to fresh air, and make him blow his nose and gargle. If necessary, get medical treatment.
First-aid measures after skin contact	:	Wash the affected areas under running water, get medical treatment as soon as possible.
First-aid measures after eye contact	:	Wash the affected areas under running water for at least 15 minutes. Get medical treatment.
First-aid measures after	:	Rinse mouth with water. Give the victim one or two glasses of

ingestion		water or milk. Do not induce vomiting. Get medical treatment as soon as possible.
Personal Protection in First Aid and Measures	:	Rescuers should wear proper protective equipment like rubber gloves, goggles.

Most Important Symptoms/Effects

Symptoms/effects	:	Inhalation causes throat ache, cough, burning sensation of throat, vomiting and shortness of breath, unconsciousness these sympetoms may be late to develop. these sympetoms may be late to develop.

5. Fire fighting measures

Suitable extinguishing media	:	Water, dry chemical powder, carbon dioxide, dry sand, alcohol resistant foam
Unsuitable extinguishing media	:	Foam extinguisher
Firefighting instructions	:	Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area. Fight fire from windward. Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Alcohol-resistant foam extinguisher is effective for a large scale fire.
Personal protection (Emergency response)	:	Firefighters should wear protective equipment.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures

General measures	:	Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

Environmental precautions

Environmental precautions	:	Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.

Methods and Equipment for Containment and Cleaning up

For containment	:	Absorb spill with inert material (e.g, diatomaceous earth, sand) and flush spillage area with copious amounts of water.
Prevention Measures for Secondary Accidents	:	Remove nearby sources of ignition and prepare extinguishing media.

7. Handling and storage

Handling

Technical measures	:	Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited. Ventilate well at working places.
Precautions for safe handling	:	Use with an enclosed system or a local exhaust ventilation. Use in well-ventilated areas.

Storage

Storage conditions	:	Store in a dark, cool place and tightly closed.
Material used in packaging/containers	:	Glass, fluorine resin, polyethylene, stainless steel . Do not use polyvinyl chloride resin, acrylic resin.

8. Exposure controls / Personal protection equipment

ACGIH TWA	5 ppm
ACGIH STEL	10 ppm

Appropriate engineering controls : Use with an enclosed system or a local exhaust ventilation.

Protective equipment

Respiratory protection	:	Chemical cartridge respirator with acids vapor cartage or airline respirator
Hand protection	:	Acid resistant gloves
Eye protection	:	Safety goggles
Skin and body protection	:	Protective clothing, protective boots

9. Physical and chemical properties

Physical state	:	Liquid
Color	:	Colorless.
Odor	:	Pungent.
pH	:	Strong acidity
Melting point	:	8.27 ° C
Freezing point	:	No data available
Boiling point	:	100.56 ° C
Flash point	:	50 ° C (C.C.)
Auto-ignition temperature	:	601 ° C
Decomposition temperature	:	No data available
Flammability	:	Flammable
Vapor pressure	:	57.5 hPa (25℃)
Relative density	:	1.21405 (25/4℃)
Density	:	No data available
Relative gas density	:	1.59
Solubility	:	Water: Miscible. Organic solvents: Soluble in ethanol, diethyl ether, glycerol.
Partition coefficient n-octanol/water (log Pow)	:	-0.54
Explosive limits (vol %)	:	18.0 - 57.0 vol %
Viscosity, kinematic	:	1.62 mm^2/s (25℃)
Particle characteristics	:	No data available

10. Stability and reactivity

Reactivity	:	A strong reducing agent. It is a strong acid and corrodes many metals.
Chemical stability	:	Stable under normal conditions. It is hygroscopic. It slowly

		decomposes at room temperature to carbon monoxide and water.
Possibility of hazardous reactions	:	Since carbon monoxide is generated by decomposition, the internal pressure of the container may increase.
Conditions to avoid	:	Light, heat.
Incompatible materials	:	Oxidizing substances, alkaline subsutances.
Hazardous decomposition products	:	Carbon monoxide.

11. Toxicological information

Acute toxicity (oral)	:	Harmful if swallowed rat LD50=700mg/kg
Acute toxicity (dermal)	:	Classification not possible
Acute toxicity (inhalation)	:	No classification (gas) Harmful if inhaled (vapor) rat LC50=7.4mg/L/4h Classification not possible (dust, mist)
Skin corrosion/irritation	:	Causes severe skin burns There is a report that corrosivity and strong irritation were observed in a skin irritation test with rabbits, and there are many descriptions that it was corrosive to human skin, therefore, it was classified into category 1B.
Serious eye damage/irritation	:	Causes serious eye damage In eye irritation tests with rabbits, there are reports that irritation or corrosivity was observed, and that burns occurred in the cornea. In addition, there are many descriptions that it showed strong corrosivity to human eyes, and there is a description that conjunctivitis and keratitis occurred, leaving irreversible damages. From the above results, it was classified into category 1.
Respiratory sensitization	:	Classification not possible
Skin sensitization	:	No classification Based on the result that in a Buehler test (OECD TG406, GLP-compliant) with guinea pigs, after the challenge, no skin reaction was observed in all 20 treated animals and it was negative.
Germ cell mutagenicity	:	Classification not possible There were no in vivo data. As for in vitro, it was concluded that it was negative in all of bacterial reverse mutation tests, a gene mutation test and a chromosomal aberration test with cultured mammalian cells and sister chromatid exchange tests with human lymphocytes and cultured mammalian cells.
Carcinogenicity	:	No classification As for individual information, the results were negative in carcinogenicity tests with rats and mice administered by feeding at doses of potassium formate up to 2,000 mg/kg/day for 2 years. In addition, it was negative in a test in which calcium formate was administered by drinking water to male and female rats at 150-200 mg/kg/day for 1.5 years (there is a description that test conditions were inadequate). From the above, it was not classified since both carcinogenicity tests with rats and mice were negative.
Reproductive toxicity	:	Classification not possible

STOT-single exposure	:	Causes damage to organs (central nervous sustem, respiratory organs, blood, kidney) In humans, on oral ingestion, sore throat, burning sensation, abdominal pain, stomach cramps, vomiting, hyperemia, edema and necrosis of the nose, throat and gastrointestinal mucosa, esophageal stricture, stomach perforation, bleeding of the gastrointestinal tract, other than these, difficulty in swallowing, unconsciousness, central nervous system depression, severe acidosis, hemolysis, hematuria, blood coagulation disorders, anuria, uremia, acute kidney failure, nephropathy, liver function disorders, vascular shock, circulatory collapse, pneumonia and deaths were reported. Sore throat, cough, burning sensation, shortness of breath, unconsciousness, rhinitis, bronchitis, dyspnea, respiratory failure, pulmonary edema, acidosis, acute renal failure and death were observed by the inhalation exposure to the vapour. By dermal exposure, death after 6 hours due to significant difficulty in swallowing and dyspnea in a worker who was accidentally splashed in the face with hot formic acid, and burns and severe acidosis in an accident where more than 35% of the whole body skin of a 3-year-old girl was exposed, were reported. As for experimental animals, hunched posture, dyspnea, bloody nose and blood in the urine, and hypothermia were observed by oral administration to rats, hyperemia of the stomach, liver and kidney were observed in the pathological examination, and salivation, loss of pain reflex, dyspnea, respiration sounds, flatulence, apathy, hunched posture, and unsteady gait were observed after inhalation exposure in rats. These findings were within the guidance value range corresponding to category 1. From the above, it was classified into category 1 (central nervous system, respiratory organs, blood, kidney).
STOT-repeated exposure	:	May cause damage to organs (respiratory organs) through prolonged or repeated exposure There was no information on the effects of repeated exposure to this substance in humans. As for experimental animals, in studies in which rats and mice were exposed to the vapor of this substance by inhalation for 13 weeks, although no systemic effects to identify the target organ were observed, as for local effects, degeneration of the olfactory epithelium (rats and mice) and squamous metaplasia of the respiratory epithelium (rats) were observed at the concentration corresponding to category 1 (0.12 mg/L/6 hours) in mice and at that corresponding to category 2 (0.24 mg/L/6 hours) in rats. Since the effects by inhalation exposure with humans were unknown, it was classified in category 2 (respiratory organs) based on the category corresponding to the concentrations at which the effects on the respiratory organs were commonly observed in both of rats and mice.
Aspiration hazard	:	Classification not possible

12. Ecological information

Ecotoxicity

Aquatic acute	:	Harmful to aquatic life Desmodesmus subspicatus EC50=25mg/L/96h
Aquatic chronic	:	No classification Daphnia magna EC50=540mg/L/48h (as potassium formate)

Persistence and degradability

Readily biodegradable
BOD : 110%

Bioaccumulative potential

Low bioconcentration
log Pow : 0.54

Mobility in soil

No additional information available

Hazardous to the ozone layer

Ozone : Classification not possible

13. Disposal considerations

Ecological waste information : Mixed with flammable organic solvents and burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.

Alkaline solution should be used for cleaning liquid of the scrubber.

Contaminated container and packaging : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

International Regulations

Transport by sea(IMDG)

UN-No. (IMDG) : 1779
Proper Shipping Name (IMDG) : FORMIC ACID
Packing group (IMDG) : II
Transport hazard class(es) (IMDG) : 8 (3)

Air transport(IATA)

UN-No. (IATA) : 1779
Proper Shipping Name (IATA) : Formic acid
Packing group (IATA) : II
Transport hazard class(es) (IATA) : 8 (3)

Marine pollutant : Not applicable

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollutant category : Y
MFAG-No : 153

15. Regulatory information

Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

16. Other information

Data sources : Solvents Handbook, T, Asahara el, Kodansha Scientific Ltd. (1976) .
Handbook of dangeroous and hazardous chemicals, Japan Industrial Safety & Health Association. (2000-2001) .
Dangerous Properties of Industrial Materials,6th ed.

N.I.Sax Van Nostrand Reinhold Company (1984) .
Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .
Handbook of 17322 Chemical Products, The Chemical Daily Co. (2022) .
NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully.The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements.The information herein is only provision of information, and it does not represent a guarantee the properties of the product.The Safety Data Sheet(SDS) is prepared based on JIS Z7253.