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SAFETY DATA SHEET

1. Chemical Product and Company Identification

Product name :	Monochloroacetic acid (synonym: Chloroacetic acid)
Company name :	Denak Co., Ltd.
Address :	Kudan First Place, 4-1-28 Kudan Kita, Chiyoda-ku, Tokyo, 102-0073 Japan
Responsible person :	Marketing manager
Phone number :	+81-3-5215-7701 (main phone number)
FAX number :	+81-3-5215-7705
E-mail address :	Junji.otsuka@akzonobel.com
Emergency contact :	Denak Co., Ltd., Omi plant, ML•MCA section (Inside Denka Company Limited)
Emergency phone number :	+81-25-562-6451 (office), or -6466 (control room)
Reference number :	005

2. Hazards Identification

GHS classification :

- Physical and chemical hazards : Classification not possible
- Health hazards
 - Acute toxicity (Oral) Category 3
 - Acute toxicity (Dermal) Category 3
 - Acute toxicity (Inhalation/vapour) Not applicable
 - Acute toxicity (Inhalation/mist) Classification not possible
 - Skin corrosion/irritation Category 1A
 - Serious eye damage/irritation Category 1
 - Respiratory sensitization Classification not possible
 - Skin sensitization Classification not possible
 - Germ cell mutagenicity Classification not possible
 - Carcinogenicity Not classified
 - Reproductive toxicity Category 2
 - Specific target organ toxicity (Single exposure) Category 1 (nerves system, heart, kidney, liver, respiratory organs)
 - Specific target organ toxicity (Repeated exposure) Category 2 (respiratory organs, heart, liver)
 - Aspiration hazard Classification not possible
- Environmental hazards
 - Hazards to the aquatic environment Category 1
 - acute hazard
 - Hazards to the aquatic environment Not classified
 - chronic hazard

GHS label elements

- Pictogram



- Signal words: Danger
- Hazard statements
 - Harmful if swallowed
 - Harmful in contact with skin
 - Causes severe skin burns and eye damage
 - Causes serious eye damage
 - Suspected of damaging fertility or the unborn child
 - Causes damage to organs (nerves system, heart, kidney, liver, respiratory organs)
 - May cause damage to organs (respiratory organs, heart, liver) through prolonged or repeated exposure
 - Very toxic to aquatic life
- Precautionary statements

Hazard	Category	Precautionary statements			
		Prevention	Response	Storage	Disposal
Acute toxicity - Oral	3	Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.	IF SWALLOWED: Immediately call a doctor. Rinse mouth. (if immediate administration of antidote is required) Specific treatment (Reference to supplemental first aid instruction ... on this label).	Store locked up.	Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).
Acute toxicity - Dermal	3	Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer /supplier or the competent authority to specify type of equipment.)	Remove/Take off immediately all contaminated clothing. IF ON SKIN: Wash with plenty of water and soap. Call a doctor if you feel unwell. (Manufacturer/supplier or competent authority may specify a cleansing agent if appropriate.) Specific treatment (Reference to supplemental first aid instruction ... on this label).	Store locked up.	Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).

			Wash contaminated clothing before reuse.		
Skin corrosion /irritation	1A	<p>Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer /supplier or the competent authority to specify type of equipment.)</p> <p>Wash hands thoroughly after handling.</p> <p>Do not breathe dusts or mists (if inhalable particles of dusts or mists may occur during use).</p>	<p>IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.</p> <p>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. continue rinsing.</p> <p>IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.</p> <p>IF INHALED: Remove person to fresh air and keep comfortable for breathing. Specific treatment (Reference to supplemental first aid instruction ... on this label). (Manufacturer/supplier or competent authority may specify a cleansing agent if appropriate.)</p>	Store locked up.	Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).
Serious eye damage /irritation	1	<p>Wear eye protection/face protection. (Manufacturer /supplier or the competent authority to specify type of equipment.)</p>	<p>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. continue rinsing.</p> <p>Immediately call a doctor.</p>		
Reproductive toxicity	2	<p>Obtain special instructions before use.</p> <p>Do not handle until all safety precautions have been read and</p>	<p>IF exposed or concerned: Get medical advice /attention.</p>	Store locked up.	Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).

		<p>understood.</p> <p>Avoid contact during pregnancy /while nursing.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Do not breathe dusts or mists (if inhalable particles of dusts or mists may occur during use).</p> <p>Wear the personal protective equipment specified.</p>			
Specific target organ toxicity (Single exposure)	1	<p>Do not eat, drink or smoke when using this product.</p> <p>Wash hands thoroughly after handling.</p> <p>Do not breathe dust /fume /gas /mist /vapours /spray.</p>	<p>IF exposed: Call a doctor. (if immediate measures are required.)</p> <p>Specific treatment (Reference to supplemental first aid instruction ... on this label).</p>	Store locked up.	Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).
Specific target organ toxicity (Repeated exposure)	2	<p>Do not breathe dust /fume /gas /mist /vapours /spray.</p>	<p>Get medical advice /attention if you feel unwell.</p>		Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).
Hazards to the aquatic environment - acute hazard	1	<p>Avoid release to the environment (if this is not the intended use).</p>	Collect spillage		Dispose of contents /container to ... (in accordance with local /regional /national /international regulations).

- Other hazards which do not result in GHS classification, important signs, expected emergency overview :
 - Most important hazard :
 - ① Permeability to the skin is high, and causes burns and gangrene.
 - ② Because may result in death treatment if response is delayed, to take action that is described in "4. Emergency treatment" quickly.
 - ③ Since it may appear effects is delayed, Medical observation is required.
 - Hazards :
 - ① If on skin, very strong irritative and corrosive is shown.

- ② If in eyes, strongly stimulate the cornea, and cause inflammation.
- ③ If inhaled, violently invade to mucous membranes of the nose, throat and bronchial etc.
- Specific hazard : It is a strong acidified.
- Country / regional information : Japan; Acute toxic material, corrosive material

3. Composition/Information on Ingredients

Single chemical substance/mixture :	Single chemical substance
Chemical name :	Monochloroacetic acid
Synonym :	chloroacetic acid
Ingredients and contents	Monochloroacetic acid 99.8%, Water 0.2%
Chemical property :	CH ₂ ClCOOH, molecular weight 94.50
Serial no. of government gazette :	(2)-1145
CAS No :	79-11-8
Hazardous components :	Monochloroacetic acid
Hazardous impurities :	Not applicable

4. First-aid Measures

Upon hospital treatment, please hand this SDS to the doctor.

If there is concern that touched or ingested or was exposed to the vapor to monochloroacetic acid, or if the symptoms are observed, please get medical advice by a doctor always. In addition, since it may appear effect delayed, Medical observation is required.

- If inhaled :
- ① Wrap the patient in blanket and keep at rest, and remove to fresh air immediately.
 - ② Transport to the hospital immediately.
 - ③ If the breathing is difficult, or if the breathing has stopped, to use artificial respiration or artificial resuscitation equipment immediately.
- If on skin :
- ① If monochloroacetic acid is contacted on the skin, most important thing is to soak in sodium bicarbonate water as soon as possible, or is to wash away with plenty of water.
 - ② If wide range, at least 4 hours or more, soak in a bath of sodium bicarbonate water which concentration about 3-5% (water temperature 25~30°C), and get medical attention.
 - ③ Remove/Take off immediately contaminated clothing with take action above.
- If in eyes :
- ① Because causes damage to the cornea and eyelid, wash with plenty 0.9% saline water or clean water for at least 15 minutes and get medical attention by an ophthalmologist.
 - ② Eyewash is effective that performed spread the eyelids with thumb and index finger.

If swallowed :	<p>③ If using a contact lenses, wash by removing unless it is fixed.</p> <p>① Rinse the mouth thoroughly, and drink a water. (however, do not induce vomiting.)</p> <p>② Keep at rest, and breathe fresh air, and keep the posture as leaning against the object, and transport to the hospital.</p>
Most important sign and symptom :	Pain of the skin, burning pain, severe burns, cold sweat, nausea, edema, difficult breathing, reduction in blood pressure, coma, shock state, pain or swelling of the eye, pain or oppressive feeling of respiratory tract and lung.
Protection for first-aiders :	If to rescue the victims, wear dust mask, acid-resistant clothing, boots, goggles or full face shield, rubber or PVC gloves.
Special note to doctor :	Monochloroacetic acid penetrates the skin, and to form Sodium monochloroacetate by react with the components of the cell and blood immediately, and it proceeds to other tissues, including the brain through the blood (destruction of the cell). Furthermore, rapid response is required because it is considered to form monochloroacetic acid compounds by interaction between high concentration MCA and the blood and cellular components and cause serious symptoms. If contacted on the skin, most important thing is to soak in sodium bicarbonate water as soon as possible, or is to wash away with plenty of water. If possible, at least 4 hours or more (until white spots of burns disappear), soak in a bath of sodium bicarbonate water which concentration about 3-5% (water temperature 25~30°C). If burns range is 1% or more, since there may become a serious accident, to carry out continuous monitoring of symptoms for 24 hours or more. Worsening of symptoms appear in decreased blood pressure and vomiting. The therapeutic agents of the skin use Flamazine ointment, the Hirudoid ointment. For example of the treatment, there is blood pressure measurement, measurement of MCA-components in blood, artificial respiration, artificial resuscitation, N-acetyl cysteine treatment (detoxification treatment), hemodialysis, plasma exchange, alkalizing.

5. Fire Fighting Measures

Extinguishing media :	To extinguish use alcohol resistant foam, carbon dioxide, dry chemical, water.
Unsuitable extinguishing media :	It is not specifically, but avoid water spray to the product directly.

Special risk•hazard

In case of fire or explosion, do not breathe fumes.

When combustion or decomposition of the product, generate carbon dioxide, formaldehyde, and carbon monoxide.

Special fire fighting method :

Move container to a safe place immediately. If the container cannot be moved, it is cooled by water spray in and around the container to prevent damage container.

Since the product is soluble in water, avoid water spray to the product directly.

Prevent from entering of the spillages to the drainage pipe, drainage ditch or waterway.

It must be cleaned thoroughly after use facilities.

Protection for fire fighters :

Warning to the fire brigades, convey the hazards and properties.

As fire-fighting gloves that made by Kevlar fibers is passed through the water, wear rubber gloves when working removal.

Protective clothing, respirator, dust mask, rubber boots, rubber or PVC gloves, goggles or full face shield.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency measures :

Avoid contact with skin and eyes.

Do not breathe dust.

As corrosive is very strong, in the case of work, wear protective equipment (protective clothing, respirator, closed-circuit oxygen respirator, rubber boots, rubber or PVC gloves, goggles or full face shield, etc.) to avoid direct contact or inhalation of the product.

If necessary, prohibit the entry of people to the around the leakage area by put a rope, etc.

Warning to the fire brigades, convey the hazards and properties.

Precautions for the environment :

Prevent from discharge of the spillage into the rivers.

By any chance if mixed or concerned mixing, contact immediately to relevant organizations.

Method and Equipment for recovery, neutralization, containment, clean-up :

① Enclose soil, sand, etc., so that it does not spread, and then prohibit the entry of unauthorized person to the around the leakage area by put a rope, etc.

② Leakage point is neutralized with soda ash (Na_2CO_3) or sodium bicarbonate (NaHCO_3). If not have soda ash or sodium bicarbonate, can be used magnesium lime or hydrated lime in place of it.

③ Wipe off the spillage as much as possible, and collect in a container and then dispose it.

④ Remove the residue by washing with plenty of water.

7. Handling and Storage

Handling :

- Technical measures :
- ① Avoid overheating to prevent explosion or fire.
 - ② Wear protective equipment when handling because it is corrosive extremely high.
 - ③ Described in Section 8 for personal protective equipment.

Precaution : Handle in a well-ventilated area, and avoid eating and drinking in a handling area.

Precaution for safe handling : Avoid contact with alkaline and amine.

Storage :

- Proper storage condition :
- ① Keep away from direct sunlight, water leaks, moisture, and heat to prevent deterioration (or deformation), and store at room temperature.
 - ② Keep away from fire, heat source, sources of ignition to prevent fire.

Safe container and packaging material : Because monochloroacetic acid is corrosive extremely high, use the storage container made by SUS316, SUS316L, PVC FRP, polyethylene FRP, or Glass Lining.

8. Exposure Controls and Personal Protective Equipment

- Engineering controls :
- ① Provide an appropriate ventilation equipment.
 - ② Provide eye wash facility, shower for body cleaning, hand wash and emergency bath (water or about 3-5% sodium bicarbonate water) near the work place where the product is handled, and display clearly the location.

Permissible exposure level : The Japan Society for Occupational Health : Not established
ACGIH TLV-TWA : 0.5ppm (2004)

Personal protective equipment :

Respiratory protection : Gas mask for organic gases, respirator

Hand protection : Rubber or PVC protective gloves

Eye protection : Safety glasses with side shield or full face shield

Skin and body protection : Acid-resistant clothing, protective boots

9. Physical and Chemical properties

Physical state

Form :	Solid (Flakes)
Color :	White
Odor :	Pungent odor of acetic acid type
pH :	<1 (800g/L-water, 20°C)
Temperature/temperature range of specific physical state changes	
Boiling point :	189°C ³⁾
Melting point :	α-type 63°C ,β-type 56.2°C ,γ-type 52.5°C ³⁾
Flash point :	126°C ³⁾

Ignition point :	470°C ³⁾
Explosive limits :	lower limit 8%
Vapor pressure :	8.6Pa (25°C) ³⁾
Vapor density :	3.26 (air=1.0) ³⁾
Relative density :	1.58 ³⁾
Bulk density :	850~900kg/m ³
Solubility	
Solubility in water	Easily soluble
Partition coefficient (n-octanol/water) :	log Pow=-0.2 (calculated value)
Decomposition temperature :	No data

10. Stability and Reactivity

Stability :	When temperature exceeds 250°C, it pyrolytically decomposes. (also refer to Section 7)
Reactivity :	React with alkaline and amine.
Incompatible materials :	May generate hydrogen by contact with the base metals.
Hazardous decomposition products :	Generate chlorine gas, formaldehyde. (also refer to Section 5)

11. Toxicological Information

Acute toxicity :	Oral	Rats	LD ₅₀	580mg/kg ²⁾
	Respiratory administration	Rats	LC ₅₀	180mg/kg ²⁾
	Subcutaneous injection	Mice	LD ₅₀	250mg/kg ²⁾
Skin corrosion/irritation :	In four hours application test, the results of the skin irritation test using rabbits, irreversible severe skin irritation and corrosive was observed. ⁵⁾			
Serious eye damage/eye irritation :	Results of eye irritation test using rabbits, it is observed "severe eye irritation", and in addition, it is shown strong irritative and corrosive to the eye in the epidemiological data. ⁵⁾⁶⁾			
Carcinogenicity :	It is classified as A4 in ACGIH. ⁷⁾			
Reproductive toxicity :	In a teratogenicity study in rats in SIDS (1996) that is a In a teratogenicity study in rats, malformation of fetal heart has increased significantly in dose that is observed general toxicity in the dams.			
Specific target organ toxicity/systemic toxicity (Single exposure) :	In the humans, there is description that "nausea, vomiting, disorder of the cardiovascular system, loss of consciousness, disorder of the nervous system such as coma" ⁵⁾ , in addition, there is description that "disorientation, excitement, heart failure and coma, intense metabolic acidosis, rhabdomyolysis, fatty infiltration of the liver, renal failure and cerebral edema, severe local irritation to the respiratory tract, pulmonary edema". ⁸⁾			

Specific target organ toxicity/systemic toxicity (Repeated exposure) :	In the experimental animals, there is description that "cellular infiltration around the vein and wall thickening of the lung peripheral" ⁵⁾ , in addition, there is description that "degeneration of the heart muscle, chronic inflammation of the nasal cavity, moderate inflammation in the liver". ⁸⁾
Hazards to aquatic environment :	72-hour ErC50 = 0.033mg/L ⁹⁾ in algae (Scenedesmus).
Aspiration hazard :	If inhaled, violently invading mucous membranes of the nose, throat, bronchi, etc.

12. Ecological Information

Persistence/Degradability :	It is easy to be degraded by micro-organisms in water.
Ecotoxicity	
Toxicity of fish :	Rainbow trout 900~2,000ppm ⁴⁾
Other information :	Prevent from discharge into the sewage.

13. Precautions for Disposal

See Section 8 for personal protective equipment.	
Follow the standard that relates to methods of disposal in poisonous and deleterious substances.	
Disposal of the product :	When performing the incineration, to take measures processing for incineration exhaust gas because the hazardous gas (hydrogen chloride gas, carbon dioxide, formaldehyde, carbon monoxide) is generated.
Residual waste :	Neutralize with soda ash (Na ₂ CO ₃) or sodium bicarbonate (NaHCO ₃), and then, dispose with plenty of water.
Disposal of contaminated containers and packaging :	Neutralize with soda ash (Na ₂ CO ₃) or sodium bicarbonate (NaHCO ₃), and then, dispose it.

14. Transport Information

International regulation :	
IMDG Code(International Maritime Dangerous Goods Code) :	
Class 6.1 Subsidiary risk 8 Packing group II	
ICAO-TI (International Civil Aviation Organization Technical Instructions) / IATA-DGR (International Air Transport Association Dangerous Goods Regulations) :	
Class 6.1 Subsidiary risk 8 Packing group II	
UN classification :	Class 6.1 Subsidiary risk 8 Packing group II
UN number :	1751
UN proper shipping name :	CHLOROACETIC ACID, SOLID
Packing group :	II
Marine pollutant :	Not applicable
Domestic regulation :	Poisonous and Deleterious Substances Control Act :
	Cabinet Order Article 2 Deleterious Substances
	Road Act :
	Enforcement Order Article 19-13 No.1 Poisonous and Deleterious Substances (Restriction of vehicular traffic)

- Specific safety measure and condition of transport :
- ① By the Poisonous and Deleterious Substances Control Act, the container follows "standards for transport container of poisonous and deleterious substances".
 - ② The container label is required 'non-medical', 'Deleterious Substances (red letter on white) ', ingredient name and its contents (requires the name and address of the manufacturer in the case of sale by the container).
 - ③ If transport by a vehicle etc., to make carry the transport note or yellow card to the transporter.
 - ④ Keep dry.

15. Regulatory Information

Poisonous and Deleterious Substances Control Act :

Cabinet Order Article 2 Deleterious Substances

Marine Pollution and Marine Disaster Prevention Law :

Enforcement Order Appended table 1, Noxious liquid substances (Category C)

Act on the Control of Import, Export, etc. of Specified Hazardous Wastes and Other Wastes :

Article 2 paragraph 1, 1-1 / Notification of three ministries

Regulations for the Carriage and Storage of Dangerous Goods in Ships :

Article 2, 3, Dangerous Goods Notification Appended Table 1, Toxic substances

Act on Port Regulations :

Enforcement Order Article 12, Dangerous Goods Notification, Toxic substances

Road Act :

Enforcement Order Article 19-13 No.1 Poisonous and Deleterious Substances (Restriction of vehicular traffic)

Civil Aeronautics Act :

Enforcement regulations Article 194, Dangerous Goods Notification Appended Table 1, Toxic substances: Poisonous Substances

Act on Control of Household Products Containing Harmful Substances :

Article 2, harmful substances

Waterworks Act :

Article 4 paragraph 2 (water quality standards)

Industrial Safety and Health Act :

Article 57-2, notifiable substances: Not applicable

Fire Services Act :

Article 9-2, Substances requiring notification of storage, etc.

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof :

Class I Designated Chemical Substance, No.80

Foreign Exchange and Foreign Trade Act :

Export Trade Control Order Article 1 Appended table 1, No. 16 (organic chemicals H.S29-15•40)

Export Trade Control Order Appended table 2 (Export approval)

16. Other Information

- ① This information is accurate in the full extent of the knowledge of the author, but it is not complete about absolute accuracy of its contents and the comprehensiveness of the information collection.
- ② In addition, this information is concerned with ingredients and products. We do not assume that a case in which this material is processed or combined with other materials.
- ③ Especially please do not use it in medical use.
- ④ Responsibility for the final decision to the proper use of this material, and this information adapt to own handling and to be completely satisfactory is located in the user.
- ⑤ Since all materials have unknown hazards, care must be taken when handling. In this MSDS, it is mentioned about the specific dangers, but it does not mean that the other risk does not exist.
- ⑥ Before using, make the pre-test by yourself always, please check in your responsibility whether conform to the intended use or safety.
- ⑦ Please note that the contents of this document is a case to change without notice by the new knowledge.

Contact information about contents of description :

Denak Co., Ltd.

Phone number : +81-3-5215-7701

FAX number : +81-3-5215-7705

Reference :

- 1) Poisonous and Deleterious Substances Control Act statute book Yakumu kohosha (2001)
- 2) Chemical safety management data book (2nd revised edition) The Chemical Daily Co., Ltd. (2000)
- 3) International Chemical Safety Cards (ICSC)
- 4) Kanagawa Prefecture Chemical Safety Information System, (kis-net)
<http://www.k-erc.pref.kanagawa.jp/kisnet/>
- 5) CERI Hazard Data Collection 98-9, (1999)
- 6) EU-RAR No.52, (2005)
- 7) ACGIH (2005)
- 8) Risk assessment report by Ministry of the Environment, Volume 3 (2004)
- 9) CERI•NITE Hazard Assessment Report (provisional version), (2006)