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## Safety Data Sheet

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### 1. Product and company identification

Product name : AQUALYTE RO  
Part No. : E327338-A, E327338-B  
Company information  
Name of supplier : HIRANUMA Co., Ltd.  
Address : 1739 Motoyoshida, Mito, Ibaraki, 310-0836, JAPAN  
Name of section : Quality assurance department  
Telephone number : +81-29-247-7343  
Facsimile number : +81-29-240-0381  
Mail address : info-f2@hiranuma.com  
Name of Manufacturer : KANTO CHEMICAL CO., INC.  
Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo,  
103-0022, JAPAN  
Recommended use : For research use only  
Restrictions on use : Seek expert judgment when using the product for  
applications other than those recommended.

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### 2. Summary of danger and Hazard

GHS classification  
Physical and chemical hazard  
Flammable liquids : Category 2  
Human health hazard  
Acute toxicity (oral)  
: Category 4  
Acute toxicity (inhalation : vapors)  
: Category 3  
Skin corrosion/irritation  
: Category 2  
Serious eye damage/eye irritation  
: Category 1  
Skin sensitization : Category 1  
Germ cell mutagenicity  
: Category 2  
Carcinogenicity : Category 2  
Reproductive toxicity  
: Category 1B

Specific target organ toxicity (single exposure)  
: Category 1, Category 3 (anesthetic action)

Specific target organ toxicity (repeated exposure)  
: Category 1, Category 2

Environmental hazard

Aquatic acute : Category 2

Aquatic chronic : Category 2

Pictograms or symbols



Signal word : Danger

Hazard statements : Highly flammable liquid and vapor  
Harmful if swallowed  
Toxic if inhaled  
Causes skin irritation  
Causes serious eye damage  
May cause an allergic skin reaction  
Suspected of causing genetic defects  
Suspected of causing cancer  
May damage fertility or the unborn child  
Causes damage to organs (central nervous system, visual organs, systemic toxicity, liver, kidney, respiratory organs, cardiovascular)  
May cause drowsiness and dizziness  
Causes damage to organs (central nervous system, visual organs, liver, kidney, respiratory organs) through prolonged or repeated exposure  
May cause damage to organs (blood, thyroid gland) through prolonged or repeated exposure  
Toxic to aquatic life  
Toxic to aquatic life with long lasting effects

Precautionary statements

Prevention : Do not handle until all safety precautions have been read and understood.  
Keep away from ignition sources such as heat, sparks, or open flame.

	<p>Keep containers tightly closed.</p> <p>Ground container and receiving equipment in case of transport and stirring.</p> <p>Use explosion-proof apparatus.</p> <p>Use only non-sparking tools.</p> <p>Do not breathe dust, mist, and vapor.</p> <p>Use only in a well-ventilated area.</p> <p>Avoid release to the environment.</p> <p>Do not eat, drink or smoke when using this product.</p> <p>Contaminated work clothing should not be allowed out of the workplace.</p> <p>Wear appropriate protective gloves, glasses, clothing, face shield, or mask.</p> <p>Wash protective equipment thoroughly after use.</p> <p>Wash hands thoroughly after handling.</p>
Response	<p>: If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately get medical treatment.</p> <p>If swallowed: Rinse mouth, Get medical treatment if you feel unwell.</p> <p>If in eyes : Rinse cautiously with water for several minutes. Get medical treatment.</p> <p>If on skin : Remove contaminated clothing and the substance. Immediately get medical treatment.</p> <p>If exposed, get medical treatment.</p> <p>Get medical treatment, if you feel unwell.</p> <p>Collect leakage</p>
Storage	<p>: Tightly container closed and store in a well-ventilated area.</p> <p>Store locked up.</p>
Disposal	<p>: Dispose of contents and containers appropriately in accordance with related regulations.</p>

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### 3. Composition/Information on ingredients

Substance/Mixture : Mixture

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Methanol	29	CH <sub>3</sub> OH	Listed	200-659-6	67-56-1
Chloroform	53	CHCl <sub>3</sub>	Listed	200-663-8	67-66-3
2,2'-Iminodiethanol	10-15	(HOCH <sub>2</sub> CH <sub>2</sub> ) <sub>2</sub> NH	Listed	203-868-0	111-42-2
Sulfur dioxide	5-10	SO <sub>2</sub>	Listed	231-195-2	7446-09-5
Iodine	1-5	I <sub>2</sub>	Listed	231-442-4	7553-56-2

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#### 4. First aid measures

First aid measures

- Inhalation : Remove the victim to fresh air, and make him blow his nose and gargle.
- Skin contact : Wash the affected areas under running water.
- Eye contact : Wash the affected areas under running water for at least 15 minutes. Get medical treatment.
- Ingestion : Rinse mouth with water. Give the victim one or two glasses of water or milk. Do not induce vomiting. Get medical treatment as soon as possible.
- Anticipated acute and delayed symptoms : When the steam of the methanol is inhaled, the cough, headache, dizziness, losing breath, and the evil intention, etc. might be caused. The symptom might appear delaying.
- Protection for first aid person : Rescuers wear proper protective equipment like rubber gloves, goggles.

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#### 5. Fire fighting measures

- Extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand, alcohol resistant foam
- Prohibited extinguishing media : Foam extinguisher
- Particular fire fighting : 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.  
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.

Protection for firefighters

: Wear breathing apparatus.

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## 6. Accidental release measures

Cautions for personnel

: 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.

Cautions for environment

: 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 of second accident

: Remove nearby sources of ignition and prepare extinguishing media.

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## 7. Cautions of handling and storage

Handling

Engineering measures

: Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited.  
Ventilate well at working places.  
Prevent build-up of electrostatic charges (e.g. by grounding).

Cautions for safety handling

: Use with an enclosed system or a local exhaust ventilation.  
Use in well-ventilated areas.

Cautions : Do not allow contact with oxidizing substances.

Storage

Adequate storage condition

: Store in a dark, cool place and tightly closed.

Safety adequate container materials

: Glass, fluorine resin, stainless steel

Do not use vinyl chloride resin, acrylic resin, polystyrene etc.

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## 8. Exposure control/Personal protection

Methanol	ACGIH TWA : 200ppm ACGIH STEL : 250ppm
Chloroform	ACGIH TWA : 10ppm
2,2'-Iminodiethanol	ACGIH TWA : 1mg/m <sup>3</sup>
Sulfur dioxide	ACGIH STEL : 0.25ppm
Iodine	ACGIH TWA : 0.01ppm ACGIH STEL : 0.1ppm

Engineering measures

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

Protective equipment

Respiration protective equipment

: If necessary, wear chemical cartridge respirator with an organic vapor cartage

Hands protective equipment

: Impervious protective gloves

Eyes protective equipment

: Safety goggles

Skin and body protective equipment

: Protective clothing, protective boots

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## 9. Physical and chemical properties

Appearance : Liquid

Color : Yellow

Odor : Aromatic odor

pH : No data available

Melting point : No data available

Freezing point : No data available

Boiling point : 60 °C

Flash point : 22 °C

Auto-ignition temperature

: 470 °C (as methanol)

Decomposition temperature

	: No data available
Flammability	: Flammable
Vapor pressure	: 212hPa(20°C)(as chloroform)
Relative density	: No data available
Density	: 1.1g/cm <sup>3</sup> (20 °C)
Relative gas density	: No data available
Solubility	: Water : Soluble Organic solvents : Miscible with many kinds of organic solvents like ethanol, diethyl ether.
Partition coefficient n-octanol/water (Log Pow)	: No data available
Explosive limits (vol %)	: 5.5 - 26.5 vol %
Viscosity, kinematic	: No data available
Particle characteristics	: No data available

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## 10. Stability and reactivity

Reactivity	: React with oxidizing substances.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: React with oxidizing substances.
Conditions to avoid	: Light, heat
Incompatible materials	: Oxidizing substances
Hazardous decomposition products	: Carbon monoxide, Nitrogen oxide, Sulfur oxide, Chlorine, Hydrogen chloride

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## 11. Toxicological information

Acute toxicity(oral)	: Harmful if swallowed (as chloroform) rat LD50=440mg/kg (as Iodine) rat LD50=315mg/kg
Acute toxicity(dermal)	: No classification (as methanol)

rabbit LD50=15800mg/kg

(as Iodine)

rat LD50=3333 mg/kg

#### Acute toxicity (inhalation)

: Toxic if inhaled (vapor)

(as Iodine)

rat LC50=35ppm/4H

Classification not possible (dust, mist)

#### Skin corrosion/irritation

: Causes skin irritation

Chloroform: There is evidence including "in rabbit skin irritation tests in which undiluted chloroform was applied to abdominal skin for 24 hours, slight hyperemia, moderate necrosis and eschar formation were observed," "after undiluted chloroform was applied, severe irritation was observed," and "after the substance was applied to rabbit ears 1-4 times, slight hyperemia and excoriation were noted." Thus, the product was classified into category 2.

#### Serious eye damage/eye irritation

: Causes serious eye damage

Based on the result of eye irritation tests of chloroform using rabbits, causes severe eye irritation with mydriasis, keratitis, and translucent zones in the cornea, and a purulent haemorrhagic discharge, it was classified into category 1.

#### Respiratory sensitization

: Classification not possible

#### Skin sensitization

: May cause an allergic skin reaction

Iodine is listed in the 2nd skin group of the sensitization substance of Japan Society for Occupational Health. Thus, the product was classified into category 1.

#### Germ cell mutagenicity

: Suspected of causing genetic defects

Since chloroform has positive results of body cells in vivo mutagenicity test (micronuclei, test and chromosome aberration test), the classification is set to category 2.

#### Carcinogenicity

: Suspected of causing cancer

Japan Society for Occupational Health classifies chloroform as

the group 2B(The chemical is possibly carcinogenic to humans.). IARC classifies 2,2'-iminodiethanol as group 2B (possibly carcinogenic to humans). From the above results, it was classified into category 2.

Reproductive toxicity : May damage fertility or the unborn child

Methanol : In a developmental toxicity test by inhalation exposure to mice during organogenesis period, fetal resorptions and exencephaly were observed. Additionally, similar effects including cleft palate were reported in other inhalation and oral exposure tests. For effects of methanol on reproduction, scientific decisions concerning health risks are generally based on what is known as weight-of-evidence approach. Recognizing the lack of human data and the clear evidence of laboratory animal effects, it was concluded that methanol may adversely affect human development if exposures are sufficiently high. Based on the information, the product was considered to be a presumed human reproductive toxicant and it was classified into category 1B.

Specific target organ toxicity (single exposure)

: Cause damage to organs (central nervous system, visual organ, systematic toxicity, liver, kidney, respiratory organs, cardiovascular)

May cause drowsiness and dizziness

Methanol: The symptoms of acute poisoning from the substance include CNS-depression. Formate accumulates in the blood during a latency period which leads to metabolic acidosis, visual impairment or even total blindness, headaches, dizziness, nausea, vomiting, Kussmaul breathing and coma. In some cases death is the final outcome. Further, CNS disorders, especially parkinsonism-like extrapyramidal symptoms were reported. Morphological changes, necrosis in the white substance of the brain were demonstrated. Based on the human information, the substance was classified into category 1 (central nervous system). Additionally, the eye was regarded as a target organ since visual impairment is a characteristic effect. Additionally, systemic toxicity is regarded as a target organ based on the reports of headache, nausea, vomiting, tachypnea and coma as signs of metabolic acidosis. The effects of single exposures by

inhalation include narcosis. As an acute toxicity in humans, a narcotic effect results from central nervous system depression. Based on the data, the substance was classified into category 3 (narcotic effects).

Chloroform: The substance was used as an anesthetic in the past. There is human evidence including "In inhalation exposure, anesthetic actions, cough, giddiness, lethargy, hypesthesia, headache, nausea, vomiting, abdominal pain, hyposthenia, unconsciousness, coma, raptus nervorum, tachypnea, respiratory center paralysis, consciousness disorder, acute respiratory failure, arrhythmia, cardiovascular system depressant action, ventricular fibrillation, jaundice, hepatocyte degeneration and necrosis, renal tubular necrosis and renal failure were noted." and "In oral ingestion, gastralgia, nausea, vomiting, diarrhea, gastrointestinal irritation, respiratory center paralysis, raptus nervorum, coma, oliguresis, albuminuria, nephropathy, swelling of renal tubules epithelium, hyaline and fatty degeneration, hepatopathy and hepatocellular necrosis were observed." Thus, the product was classified into category 1 (central nervous system, visual organ, systematic toxicity, liver, kidney, respiratory organs, cardiovascular), category 3 (anesthetic actions), considering the concentration of each ingredient.

Specific target organ toxicity (repeated exposure)

: Cause damage to organs (central nervous system, visual organs, liver, kidney, respiratory organs) through prolonged or repeated exposure

May cause damage to organs (blood, thyroid gland) through prolonged or repeated exposure

Methanol : Based on the human evidence including "Marked symptoms due to long-term exposure to low concentration methanol were extensive eye damages" and "Occupational methanol exposure caused loss of eyesight as chronic toxic effects", it was classified into category 1 (visual organs). And based on the evidence including "Repeated exposure to methanol vapor caused headache, dizziness, insomnia and stomach damages as chronic toxic cases", it was classified into category 1 (central nervous system)..

Chloroform: There is human evidence including "In workers who

were exposed to 14 to 400 ppm (68 to 1,950 mg/m<sup>3</sup>) of chloroform for 1 to 6 months, progress of hepatitis and symptoms such as jaundice, nausea and vomiting were observed, and onset of hepatitis was also noted at exposure concentrations of 2 to 205 ppm (9.7 to 1,000 mg/m<sup>3</sup>).” There is evidence from animal studies including “In 13-week oral administration tests by gavage or drinking water administration in mice, and in 3-week oral administration test by gavage in rats, within the dose of the guidance value range of category 2 (as guidance value: 14.8 to 60 mg/kg/day), the effects on liver (enlargement, degeneration and fatty change of hepatic cells, early-stage hepatocirrhosis like changes etc.), kidney (chronic inflammation, degeneration and necrosis of proximal renal tubule etc.), spleen (atrophy of white pulp, decreased antibody-forming cell count) were observed.” and “In 13-week or 2-year inhalation exposure (vapor) tests in rats and mice, within the concentration range of category 1 (as guidance value: 0.01 to 0.106 mg/L/6 hr/day), the same histopathology in liver and kidney as above, as well as the effects on nasal cavity (hypertrophy of bone, atrophy of olfactory epithelium, metaplasia, acidophilic olfactory epithelium and respiratory epithelium) were noted.” Since central nervous system and liver from findings on humans and respiratory organs, liver and kidney from findings on animals are considered to be target organs, it was classified into category 1 (central nervous system, kidney, liver, respiratory organs). Ingestion of iodine in humans causes thyroid disease (hypothyroidism, hyperfunction or thyroiditis). Inhalation of 2,2'-iminodiethanol adversely affects respiratory tract, blood, kidney, and liver. Thus, the product was classified into category 1 (central nervous system, visual organs, liver, kidney, respiratory organs) and category 2 (blood, thyroid gland), considering the concentration of each ingredient.

Aspiration hazard : Classification not possible

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## 12. Ecological information

Ecotoxicity

Aquatic acute : Toxic to aquatic life  
(as chloroform)  
Fish(rainbow trout) LC50=1.24–2.03mg/L/96H

Aquatic chronic : Toxic to aquatic life with long lasting effects

Persistence and degradability  
: (as methanol) Readily biodegradable BOD : 92%  
(as chloroform) Not readily biodegradable BOD : 0%

Bioaccumulative potential  
: (as methanol) Low bioconcentration log Pow : -0.82  
(as chloroform) Low bioconcentration BCF : 1.4–4.7(1mg/L),  
4.1–13(0.1mg/L)

Mobility in soil : (as methanol) High mobility Koc : 2.75  
(as chloroform) High mobility Koc : 34–191

Hazardous to the ozone layer  
: Classification not possible

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### 13. Disposal consideration

Residual disposal : Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.

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

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### 14. Transport information

International Regulations

Transport by sea(IMDG)

UN No.(IMDG) : 1992

Proper shipping name(IMDG)  
: FLAMMABLE LIQUID, TOXIC, N.O.S.(Methanol, Chloroform,  
Solution)

Packing group(IMDG)  
: II

Transport hazard class(es) (IMDG)  
: 3(6.1)

Air transport(IATA)

UN No.(IATA) : 1992

Proper shipping name(IATA)

: Flammable liquid,toxic, n.o.s.(Methanol, Chloroform, Solution)  
Packing group(IATA)  
: II  
Transport hazard class(es) (IATA)  
: 3(6.1)  
Marine pollutant : Applicable  
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code  
Pollutant category : Y  
MFAG-No : 131

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## 15. Regulatory information

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

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## 16. Other information

References

- 1) Company data on file (SDS provided by manufacturer)
- 2) 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 concentrations or ranges of concentrations shown in "3. Composition/Information on ingredients" are examples calculated based on the amounts used at the time of manufacture and do not guarantee the concentrations in the product. The total value may not be 100% due to fractional processing. The Safety Data Sheet(SDS) is prepared based on JIS Z7253.