SAFETY DATA SHEET

PRODUCT NAME **KEM AQUA Titrant TR-1**

Data of issue 6/11/2018

Date of revision/ Last confirmation 3/4/2025

1. Identification of the substance or mixture and the supplier

Product name	KEM AQUA Titrant TR-1
SDS No.	GHS-0064E
Name of supplier	Kyoto Electronics Manufacturing Co., Ltd.
Address	68 Ninodan-cho, Shinden, Kisshoin, Minami-ku, Kyoto, Japan
Division	Quality Assurance Department
Phone	+81-75-691-4121
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Emergency phone	+81-75-691-4125

Recommended uses and restrictions on use

Recommended use	For analysis
Restrictions on use	When using for purposes other than those recommended, consult a specialist.

2. Hazard identification

GHS classification

Health hazards

Acute toxicity (Inhalation)	Category 4
Skin corrosion / Irritation	Category 1
Serious eye damage / Eye irritation	Category 1
Skin sensitization	Category 1
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 2(Respiratory system)
	Category 3(Narcotic effects)
Specific target organ toxicity (repeated exposure)	Category 2(Liver, respiratory tract system, Thyroid gland)

Environmental hazards

Short-term (acute) aquatic hazard	Category 2

GHS label elements

Hazard pictograms

Signal word	Danger
Hazard statements	H314 Causes severe skin burns and eye damage. H317 May cause an allergic skin reaction. H332 Harmful if inhaled. H336 May cause drowsiness or dizziness. H361 Suspected of damaging fertility or the unborn child. H371 May cause damage to organs (Respiratory organs). H373 May cause damage to organs (Liver, Thyroid gland, respiratory tract system) through prolonged or repeated exposure. H401 Toxic to aquatic life.
Precautionary statement	
Prevention	P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe mist or vapors. P264 Wash skin thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P271 Use only outdoors or in a well-ventilated area. P272 Contaminated work clothing should not be allowed out of the workplace. P273 Avoid release to the environment. P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor. P305 + P351 + P338 + P310 IF IN EYES: Rinse

	cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor. P308 + P311 IF exposed or concerned: Call a POISON CENTER/ doctor. P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention. P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage	P403 + P233 Store in a well-ventilated place. Keep container tightly closed. P405 Store locked up.
Disposal	P501 Dispose of contents/ container to an approved waste disposal plant.
Other hazards which do not result in classification	None known.

3. Composition/Information on ingredients

substance / mixture mixture

Components

No.	Chemical name	CAS No.	Concentration (% w/w)	ENCS / ISHL number
1	2-(2-ethoxyethoxy)ethanol	111-90-0	70-80	2-422、7-97
2	Imidazole	288-32-4	10-20	5-381
3	Sulfur Dioxide	7446-09-5	3-8	1-536
4	Iodine	7553-56-2	1-5	–

4. First-aid measures

General advice	Move out of dangerous area. Consult a physician. Show this material safety data sheet to the doctor in attendance. Do not leave the victim unattended.
If inhaled	Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.
In case of skin contact	Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty. If on skin, rinse well with water. If on clothes, remove clothes.

In case of eye contact	Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist. Remove contact lenses, if present and easy to do. Continue rinsing.
If swallowed	Keep respiratory tract clear. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.
Most important symptoms and effects, both acute and delayed	May cause an allergic skin reaction. Causes serious eye damage. Harmful if inhaled. May cause drowsiness or dizziness. Suspected of damaging fertility or the unborn child. May cause damage to organs. May cause damage to organs through prolonged or repeated exposure. Causes severe skin burns and eye damage.
Notes to physician	Treat symptomatically.

5. Fire-fighting measures

Suitable extinguishing media	Carbon dioxide (CO_2) Dry sand Regular foam Vermiculite
Unsuitable extinguishing media	High volume water jet
Specific hazards during fire fighting	Do not allow run-off from fire fighting to enter drains or water courses.
Specific extinguishing methods	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Use personal protective equipment. Ensure adequate ventilation.
Environmental precautions	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling

Advice on protection against fire and explosion	Normal measures for preventive fire protection.
Advice on safe handling	Avoid formation of aerosol. Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. To avoid spills during handling keep bottle on a metal tray. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Avoidance of contact	No data available
Hygiene measures	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

Storage

Conditions for safe storage	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept

	upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.
Further information on storage stability	No decomposition if stored and applied as directed.

8. Exposure controls/Personal protection

Threshold limit value and permissible exposure limits for each component in the work environment

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Reference concentration / Permissible concentration	Basis
iodine	7553-56-2	OEL-M	0.1 ppm 1 mg/m^3	JP OEL JSOH
	Further information: Skin sensitizing agent; Group 2 substances which probably induce allergic reactions in humans.			
		OEL-M	1 ppm 1 mg/m^3	JP OEL JSOH
	Further information: Skin sensitizing agent; Group 2 substances which probably induce allergic reactions in humans.			
		TWA(Inhalable fraction and vapor) STEL(Vapor) TWA(Inhalable fraction and vapor) STEL(Vapor)	0.01 ppm 0.1 ppm 1 ppm 1 ppm	ACGIH ACGIH ACGIH ACGIH
sulphur dioxide	7446-09-5	STEL	0.25 ppm	ACGIH

Personal protective equipment

Respiratory protection	Suitable respiratory equipment
Hand protection material	Protective gloves The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	Protective suit

9. Physical and chemical properties

Physical state	Liquid.
Color	Dark brown
Odor	Pungent
Melting point / Freezing point	No data available
Initial boiling point and boiling range	No data available
Flammability (liquids)	No data available
Lower explosion limit and upper explosion limit / flammability limit	
Upper explosion limit / Upper flammability limit	No data available
Lower explosion limit / Lower flammability limit	No data available
Flash point	111 ℃ (Cleveland open cup)
Decomposition temperature	No data available
pH	No data available
Autoignition temperature	No data available
Self-Accelerating decomposition temperature (SADT)	No data available
Viscosity	
Viscosity, kinematic	11.065 mm^2/s
Solubility(ies)	
Water solubility	completely soluble
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Vapor pressure	No data available
Density and / or relative density Relative density	1.06 (20 ℃)
Density	No data available
Relative vapor density	No data available
Particle characteristics Particle size	No data available

10. Stability and reactivity

Reactivity	No decomposition if stored and applied as directed.
Chemical stability	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	No decomposition if stored and applied as directed.
Conditions to avoid	No data available
Incompatible materials	No data available

11. Toxicological information

Acute toxicity	Harmful if inhaled.
Product	
Acute oral toxicity	Acute toxicity estimate >2,000 mg/kg (Calculation method)
Acute inhalation toxicity	Acute toxicity estimate 11,476 ppm (Calculation method), Exposure time 4 h, Test atmosphere gas
Acute dermal toxicity	Acute toxicity estimate >2,000 mg/kg (Calculation method)
2-(2-ethoxyethoxy)ethanol	
Acute oral toxicity	LD50 (Rat) 5,540mg/kg
Acute inhalation toxicity	LC50 (Rat) >1.39mg/L, Exposure time 4 h, Test atmosphere dust / mist
Acute dermal toxicity	LD50 (Rabbit) 8,500 mg/kg
imidazole	
Acute oral toxicity	LD50 (Rat) 960mg/kg
sulphur dioxide	
Acute inhalation toxicity	LC50 (Rat) 593 - 1319ppm, Exposure time 4 h, Test atmosphere gas
iodine	
Acute oral toxicity	LD50 (Rat) 14,000mg/kg
Acute inhalation toxicity	LC50 (Rat) >4.588mg/L, Exposure time 4 h, Test atmosphere dust / mist LCLo (Rat) 800mg/m^3, Exposure time 1h, Test atmosphere vapor
Acute dermal toxicity	LD50 (Rabbit) 1,450 mg/kg
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Product	Extremely corrosive and destructive to tissue.
imidazole	Corrosive after 4 hours or less of exposure
iodine	Skin irritation
Serious eye damage/eye irritation	Causes serious eye damage.
Product	May cause irreversible eye damage.
2-(2-ethoxyethoxy)ethanol	Causes eye irritation.
imidazole	Causes serious eye damage.
sulphur dioxide	Causes serious eye irritation.
iodine	Causes serious eye irritation.
Respiratory or skin sensitization	
Skin sensitization	May cause an allergic skin reaction.
Respiratory sensitization	Not classified based on available information.
Product	Causes sensitization.
iodine	Probability or evidence of skin sensitization in humans
Germ cell mutagenicity	Not classified based on available information.
Carcinogenicity	Not classified based on available information.
Reproductive toxicity	Suspected of damaging fertility or the unborn child.

imidazole	Suspected human reproductive toxicant
iodine	Suspected human reproductive toxicant
STOT-single exposure	May cause drowsiness or dizziness. May cause damage to organs (respiratory system, Respiratory organs).
2-(2-ethoxyethoxy)ethanol	The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.
sulphur dioxide	Target Organs Respiratory organs The substance or mixture is classified as specific target organ toxicant, single exposure, category 1.
iodine	Target Organs Respiratory organs The substance or mixture is classified as specific target organ toxicant, single exposure, category 1.
STOT-repeated exposure	May cause damage to organs (Liver, respiratory tract system, Thyroid gland) through prolonged or repeated exposure.
imidazole	Target Organs Liver The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.
sulphur dioxide	Target Organs Respiratory organs The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.
iodine	Target Organs Thyroid The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.
Aspiration toxicity	Not classified based on available information.
Remarks	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Concentrations substantially above the TLV value may cause narcotic effects. Solvents may degrease the skin.

12. Ecological information

Ecotoxicity					
2-(2-ethoxyethoxy)ethanol					
Toxicity to fish	LC50 (Pimephales promelas (fathead minnow))	9,650 mg/L,	Exposure time	96 h	
Toxicity to daphnia and other aquatic invertebrates	EC50 (Daphnia magna (Water flea))	3,340 mg/L,	Exposure time	48 h	
Imidazole					
Toxicity to daphnia and	EC50 (Daphnia magna (Water flea))	341.5 mg/L,	Exposure time	48 h	

other aquatic invertebrates	
Toxicity to algae/aquatic plants	EC50 (Desmodesmus subspicatus (green algae)) 133 mg/L, End point Growth inhibition, Exposure time 72 h EC50 (Desmodesmus subspicatus (green algae)) 25 mg/L, End point Growth inhibition, Exposure time 72 h
iodine	
Toxicity to fish	LC50 (Oncorhynchus mykiss (rainbow trout)) 0.53 mg/L, Exposure time 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 (Daphnia magna (Water flea)) 0.16 mg/L, Exposure time 48 h
M-Factor (Acute aquatic toxicity)	1
Persistence and degradability	
2-(2-ethoxyethoxy)ethanol	rapidly biodegradable
imidazole	rapidly biodegradable, Biodegradation 98%, Exposure time 18d (OECD Test Guideline 301A)
Bioaccumulative potential	
2-(2-ethoxyethoxy)ethanol	Partition coefficient: n-octanol/water log Pow = - 0.54
imidazole	Bioconcentration factor (BCF) 3.16
	Partition coefficient: n-octanol/water log Pow = - 0.02 (25℃)
iodine	Partition coefficient: n-octanol/water log Pow = - 2.49
Mobility in soil	No data available
Hazardous to the ozone layer	Not applicable
Other adverse effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic to aquatic life.

13. Disposal considerations

Waste from residues	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

14. Transport information

International Regulations

IATA-DGR

UN / ID No.	UN1760
Proper shipping name	Corrosive liquid, n.o.s. (Imidazole, solution)
Class	8
Packing group	Ⅱ
Labels	Corrosive
Packing instruction (cargo aircraft)	855
Packing instruction (passenger aircraft)	851

IMDG-Code

UN No.	UN1760
Proper shipping name	CORROSIVE LIQUID, N.O.S.（Imidazole, solution）
Class	8
Packing group	Ⅱ
Labels	8
EmS Code	F-A，S-B
Marine pollutant	no

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

Not applicable for product as supplied.

Domestic regulation: Please refer to the law and local regulations, etc. in each country

Special precautions for user: The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. Regulatory information

16. Other information

Citations/References

NITE-Gmiccs (National Institute of Technology and Evaluation)

NITE-CHRIP (National Institute of Technology and Evaluation)

Workplace Safety Site (Ministry of Health, Labor and Welfare)

SDS from various upstream manufacturers

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