Safety Data Sheet

Reference No. 2440-2

Issue: 19th July 2018

1. Chemical product and company identification

Product name Reagent for water quality measurement COD (No.44) Model LR-COD-B-2

Company name KYORITSU CHEMICAL-CHECK Lab., Corp.
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Recommended uses and restrictions Reagent for water quality measurement

2. Hazards identification

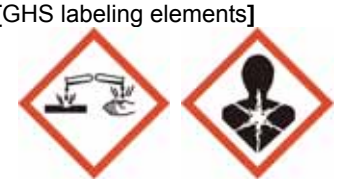
[GHS Classification]
Physical hazards: Classification not possible (no data for GHS classification available)

Health hazards:
Skin corrosion/irritation: Category 1 (applicable R-2 reagent and neutralizer)
Serious eye damage/eye irritation: Category 1 (applicable R-2 reagent and neutralizer)
Specific target organ toxicity (single exposure):
Category 2 (respiratory organs) (applicable only R-2 reagent)
For those health hazards not listed above are not classified or classification not possible (no data for GHS classification available)

Environmental hazards:
Hazardous to the aquatic environment Acute: Category 3 (applicable only R-1 reagent)
Hazardous to the aquatic environment Long term: Category 3 (applicable only R-1 reagent)

For those health hazards not listed above are not classified or classification not possible (no data for GHS classification available)

[GHS labeling elements]



[Signal word]
Danger

[Hazard statements]
Causes severe skin burns and eye damage. (applicable R-2 reagent and neutralizer)
Causes serious eye damage. (applicable R-2 reagent and neutralizer)
May cause damage to respiratory organs. (applicable only R-2 reagent)
Harmful to aquatic life. (applicable only R-1 reagent)
Harmful to aquatic life with long lasting effects. (applicable only R-1 reagent)

[Precautionary statements]
Keep out of reach of children and store in the cool, dry, and dark place.
Carefully read instructions before use and do not use for other purposes.
Wear personal protective equipment if necessary.
Do not inhale reagents.
Wash contaminated clothing.
Wash hands well before and after handling.
Avoid release to the environment.

3. Composition/ information on ingredients

Discrimination of single substance or mixture: Mixture

Reagent name	R-1 reagent		R-2 reagent		Neutralizer	
Chemical name	Potassium permanganate	Water	Sodium hydroxide	Water	Citric acid monohydrate	Water
Content	< 0.1%	> 99.9%	<5%	>95%	< 35%	> 65%
Chemical formula	$KMnO_4$	—	NaOH	H_2O	$C_6H_8O_7 \cdot H_2O$	H_2O
METI No. (reference number under CSCL in Japan)	(1)-446	—	(1)-410	—	(2)-1318	—
CAS No.	7722-64-7	7732-18-5	1310-73-2	7732-18-5	5949-29-1	7732-18-5

4. First-aid measures

If reagents or test solutions;

Enter in eyes: Immediately rinse with water for more than 15 minutes followed by the treatment from an ophthalmologist.
Contact with skin: Immediately wash out contaminated site with plenty of water.
Enter into mouth: Immediately rinse mouth with plenty of water.

If any symptoms appear after above measures, immediately get medical advice or treatment.
Especially in case ingested reagents or test solutions, immediately drink plenty of water or milk and immediately get medical advice or treatment.

5. Fire-fighting measures

Extinguishing methods: Cut off ignition sources and extinct by a suitable media.
Suitable extinguishing media: Water (water spray), powder, carbon dioxide, and dry sand.

6. Accidental release measures

In case of outdoor use: avoid spill of reagents and waste solutions.
In case of indoor use: if spilled on a table or floor, wipe off immediately spilled reagents and dispose of them. Do not contact with eyes and skin.
Avoid releasing concentrated waste solution to sewer and rivers.

7. Handling and storage

Handling: Do not inhale or ingest the reagent. Avoid contacting the reagent with eyes and skin.
Since the pH level of the remaining neutralizer is acid of 1, and the remaining R-2 reagent, test solution after measurement will be alkaline of 13 or higher, avoid contact with eyes and skin, and do not ingest the solution.
Especially for outdoor use, ensure to bring back reagents, waste solutions after the measurement and used containers.
Storage: Avoid direct sunlight and store in a well-ventilated, cool, dry, and dark place.

8. Exposure controls and personal protection

Administrative control level
Working environment standard: 0.2 mg(Mn)/m^3

Occupational exposure limits
Japan Society for Occupational health: 2 mg(NaOH)/m^3
ACGIH (TLVs): TWA 0.2 (Mn)/m^3
Ceiling, 2 mg(NaOH)/m^3
OSHA (PEL): Ceiling, 5 mg(Mn)/m^3

Engineering measures: In case indoor use it is recommended to be sealed exposure source or install local exhaust ventilation.
Install hand and eye washer near handling place and it is recommended to indicate the location.

Protective equipment: Recommended to wear protective glasses and gloves

9. Physical and chemical properties

Physical state:	R-1:	liquid reagent	15 mL x 1 glass bottle in a poly bag
	R-2:	liquid reagent	30 mL x 1 poly bottle in a poly bag
	Neutralizer:	liquid reagent	20 mL x 1 poly bottle in a poly bag
Color:	R-1: red-purple, R-2: colorless , Neutralizer: colorless		
Odor:	No odor		
pH:	7(R-1), 13 (R-2 reagent, test solution after addition of R-2 reagent), $\leq$ 1 (neutralizer)		

Melting point, boiling point, flash point, ignition point, lower explosion limit, vapor pressure, density, specific gravity, solubility, Log Pow, kinematic viscosity : not available as a mixture

10. Stability and reactivity

Avoid leaving in a place where high temperature, humid or under direct sunlight. Stable under normal use conditions and no dangerous reactions under specific conditions are expected. No information on hazardous decomposition product is available.

11. Toxicological information

No data on mixture is available. Data on each substance (R-1, R-2 reagents, and neutralizer) are shown.

R-1 reagent
Potassium permanganate (no data on solution available):
Acute toxicity: Oral-human: LDL_0: 143 mg/kg, breathing difficulty and abnormality of digestive organs
Oral-rat: LD_{50}: 1,090 mg/kg, sc-mouse: LD_{50}: 500 mg/kg
Oral-rat: LD_{50}: 750 mg/kg (EHC, 17(1981)) (NITE)
Skin corrosion/ irritation:
In a human case “Corrosion of mouth cavity, esophagus and stomach were seen in a child accidental ingestion of 174 mg.” (CICAD 12(1999)) “Redness, skin burns, pain” (ICSC(2003)).
It is considered to be corrosive to skin (NITE).
Serious eye damage/irritation:
Based on the above data, it is considered to be seriously corrosive to eyes.
Germ cell mutagenicity: DNA damage test: E. coli 200 μmol/L
Reproductive toxicity: Effects on spermatogenesis and unborn child were seen without information on maternal toxicity (EHC 17(1981)) (NITE).
Specific target organ toxicity (single exposure)
It is reported “Acute exposure of manganese dust caused lung inflammation which resulted in dysfunction of lungs along with time passage. In addition, incidence of bronchitis and manganese pneumonia was increased (CICAD 12(1999).” (NITE)
Specific target organ toxicity (repeated exposure)
In human cases “increased incidence of pneumonia”, “no emotional face, decreased blinking, micrographia, unstable arm movement, potomania of right arm, rigidity of right body”, “mental

trouble and autonomic nerve imbalance" (EHC 17(1981)), "Co-movement of eyes and hands, abnormal reaction of sense of sight" (CICAD 12(1999))", "Increased incidence of blood pressure reduction at heart dilation stage", "dysfunction of sight response time, Co-movement of eyes and hands, and stability of hands" (ATSDR (2000)). In animal studies "sudden movement, paralysis, nervous over sensitivity, severe potomania, bending and stretching of forearms, lack of bending and cyanosis, atrophy of cerebral cortex", "consolidation and inflammation of respiratory organs and blood vessels" (EHC 17(1981)) (NITE).

Other data: Not available

Water:

Acute toxicity: Oral-rat LD_{50}: >90mL/kg (used 90g/kg for the calculation of ATEmix below)

Other data: Not available

R-2 reagent

Sodium hydroxide

Skin corrosion/irritation:	Category 1
Serious eye damage/eye irritation:	Category 1
Skin sensitizer	Not classified
Germ cell mutagenicity	Not classified
Specific target organ toxicity (single exposure):	Category 1 (respiratory organs)

Other data: Not available

Water:

Acute toxicity: Oral-rat LD_{50}: > 90 mL/kg (used 90g/kg for the calculation of ATEmix below)

Other data: Not available

Neutralizer:

Citric acid monohydrate (no data on solution available):

Acute toxicity: Interperitoneal-rat: LD_{50} = 375 mg/kg (RTECS)

Serious eye damage/ eye irritation: Rabbit 5 mg/30S, Rinsed with water, slight (RTECS)

Other data: Not available

Water:

Acute toxicity: Oral-rat LD_{50}: > 90 mL/kg (used 90g/kg for the calculation of ATEmix below)

Other data: Not available

GHS classifications as a mixture of each R-1, R-2 reagents and neutralizer are shown below.

[Skin corrosion/ irritation]

R-2 reagent: Category 1 (Danger, Causes severe skin burns and eye damage.)
The pH of the mixture is ≥11.5.

Neutralizer: Category 1 (Danger, Causes severe skin burns and eye damage.)
The pH of the mixture is ≤2.

[Serious eye damage/ eye irritation]

R-2 reagent: Category 1 (Danger, Causes serious eye damage.)
The pH of the mixture is ≥11.5.

Neutralizer: Category 1 (Danger, Causes serious eye damage.)
The pH of the mixture is ≤2.

[Specific target organ toxicity (single exposure)]

R-2 reagent: Category 2 (Warning, May cause damage to respiratory organs.)
The content of Category 1 substance is ≥1% and <10%.

R-1 reagent

[Acute toxicity], [Skin corrosion/ irritation], [Serious eye damage/ eye irritation], [Respiratory or skin sensitizer] [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Specific target organ toxicity (single exposure)], [Specific target organ toxicity (repeated exposure)]. [Aspiration hazard],

From the data of ingredients, above hazard classes are "Not classified" or "Classification not possible".

R-2 reagent

[Acute toxicity], [Respiratory or skin sensitizer] [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Specific target organ toxicity (repeated exposure)]. [Aspiration hazard],

From the data of ingredients, above hazard classes are "Not classified" or "Classification not possible".

Neutralizer
[Acute toxicity], [Respiratory or skin sensitizer] [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Specific target organ toxicity (single exposure)], [Specific target organ toxicity (repeated exposure)].
[Aspiration hazard],
From the data of ingredients, above hazard classes are “Not classified” or “Classification not possible”.

12. Ecological information

No data on mixture is available. Data on R-1 reagent, R-2 reagent and neutralizer are shown.

R-1 reagent
Potassium permanganate:
Hazardous to aquatic environment Acute:
Classified as Category 1 based on data; Crustacea (*Daphnia magna*): 48-h EC_{50} = 0.084 mg/L (CERI hazard data collection, 2002) (converted to 0.242 mg/L as Potassium permanganate).
Hazardous to the aquatic environment Long term:
Classified as Category 1 based on data; BCF < 81 (Data on existing chemicals) and unknown behavior in water because of metallic compounds.
Other data: Not available

R-2 reagent
Sodium hydroxide
Hazardous to the aquatic environment Acute: Category 3
LC_{50}-48hr (*Ceriodaphnia quadrangula*) = 40 mg/L
Hazardous to the aquatic environment Long-term: Not classified

Neutralizer
Citric acid monohydrate: No eco-toxicological information available.

GHS classifications as a mixture are shown below.
[Hazardous to the aquatic environment acute]
R-1 reagent: Based on the additive equation:
Category 3 (Harmful to aquatic life)
R-2 reagent and neutralizer: Classification is not possible because of data lack.

[Hazardous to the aquatic environment chronic]
R-1 reagent: Based on the additive equation:
Category 3 (Harmful to aquatic life with long lasting effects)
R-2 reagent and neutralizer: Classification is not possible because of data lack.
[Harmful effects on the ozone layer]
Classifications are not possible because each of the substances is not described in Annex to Montreal Protocol.

13. Disposal considerations

The pH level of the remaining neutralizer is acid of 1, and the remaining R-2 reagent, test solution after measurement will be alkaline of 13 or higher. Always dispose of in accordance with local regulations.

14. Transport information

In addition to precautionary measures regarding handling and storage, avoid rough handling so as not to break containers. It is recommended to ship by air because under high temperature for long period may lead to deterioration.

UN number	3316
Proper shipping name:	Chemical Kit (Chemical measurement kit)
UN classification:	Class 9 (miscellaneous dangerous substances and articles)
Packing group:	II
Civil Aeronautics Act:	Same as above. Applicable as a “Limited Quantities of Dangerous Goods”.
Fire Service Act:	Not applicable
Total weight of the product:	ca.170 g/kit

15. Regulatory information

Poisonous and Deleterious Substances Control Act: Not applicable
PRTR Act: Not applicable
(The product contains less than 1% of Potassium permanganate and not applicable as a “Class 1 Designated Chemical Substances”)
Industrial Safety and Health Act: Applicable
R-2 reagent contains more than 1% of Sodium hydroxide.
: “Cabinet order, article 18, shall be notified the Name of the substances, #2”
: “Cabinet order, article 18-2, shall be indicated the Name of the substances, #2”
Waste Disposal and Cleaning Act: Applicable.
Since the pH of remaining solution of R-2 reagent and waste solution after measurement is more than 12.5, the remaining neutralizer is less than or 2, respectively, applicable as a “Special Controlled Industrial Waste” under the Act.

16. Other information

Reference literature

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Koukuu Kikenbutsu Yusou Houreisyu, Ed. MLIT, HOUBUN SHORIN CO., LTD. (2015)
JIS Z 7252:2014 Classification of chemicals based on “Globally Harmonized System of Classification and Labelling of Chemicals (GHS)” (Japanese Industrial Standards Committee)
JIS Z 7253:2012 Hazard communication of chemicals based on GHS-Labelling and Safety Data Sheet (SDS) (Japanese Industrial Standards Committee)
UN GHS (tentative translation, forth revised version), GHS Kankei Syocho Renraku Kaigi (2011)
Ministry of Economy, Trade and Industry, GHS Classification Guidance for Enterprises 2013 Revised Edition (2013)

NOTE) This information is not always exhaustive and use with care.
This data sheet only provides information but any description cannot be warranted.
Descriptions may possibly be changed because of new findings or modification of the current knowledge.
Precautions only cover normal handling.
This English SDS is prepared in the cooperation with the Chemicals Evaluation and Research Institute (CERI), Japan