Safety Data Sheet

Reference No. 1050

Issue: 2nd August 2001
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1. Chemical product and company identification

Product name PACKTEST Chloride (300) Model WAK-Cl(300)

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 2	(applicable only K-1 reagent)
Serious eye damage/eye irritation:	Category 2	(applicable only K-1 reagent)
	Category 2B	(applicable only K-2 reagent)
Specific target organ toxicity (single exposure):		
	Category 2(digestive tract)	(applicable only K-2 reagent)
Specific target organ toxicity (repeated exposure):		
	Category 2 (respiratory organs)	(applicable only K-1 reagent)

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

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Environmental hazards:

Hazardous to the aquatic environment, short-term (acute):	Category 1	(applicable only K-1 reagent)
Hazardous to the aquatic environment, long-term (chronic):	Category 1	(applicable only K-1 reagent)
Harmful effects on the ozone layer:	Classification not possible (no data for GHS classification available)	

[GHS labeling elements**]**

[Signal word**]**
Warning

[Hazard statements**]**
（Statements are applicable only for K-1 reagent)
Causes skin irritation.
Causes serious eye irritation.
May cause damage to respiratory organs through prolonged or repeated exposure.
Very toxic to aquatic life.
Very toxic to aquatic life with long lasting effects.
（Statements are applicable only for K-2 reagent)
Causes eye irritation.
May cause damage to digestive tract.

[Precautionary statements**]**

Keep out of reach of children and store in the dry and dark place at room temperature.
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	K-1 reagent		K-2 reagent		
Chemical name	Silver nitrate	Water	Potassium Priodate	Sodium Sulfate	Polyethylene
Content	1 – 4.9 %	90 – 99 %	1 – 4.9 %	5 - 9.9 %	90 – 99 %
Chemical formula	AgNO3	H2O	KIO4	Na2SO4	(C2H4)n
METI No. (reference number under CSCL in Japan)	(1)-8	–	(1)-441	(1)-501	(6)-1
CAS No.	7761-88-8	7732-18-5	7790-21-8	7757-82-6	9002-88-4

4. First-aid measures

If reagents or test solutions;

Enter in eyes: Immediately rinse eyes thoroughly.
Contact with skin: Immediately wash out contaminated site with plenty of water.
Enter into mouth: Immediately rinse mouth with plenty of water.

If ingested or in case any symptoms appear after above measures, 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 (mist), powder, carbon dioxide, 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 or skin.
Concentrated waste solutions should not be released into sewer or rivers.

7. Handling and storage

Handling: Care should be made so that reagents will not contact with eyes or skin and to avoid ingestion.
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, dry and dark place at room temperature.

8. Exposure controls and personal protection

Administrative control level

Working environment standard: Not established

Occupational exposure limits

Japan Society for Occupational health: 0.01 mg (Ag)/m^3

ACGIH (TLVs): TWA 0.01 mg (Ag)/m^3 (only for Silver nitrate)

Protective equipment: Recommended to wear protective glasses and gloves

9. Physical and chemical properties

Physical state:	K-1: Liquid reagent	3 mL x 1 poly-bottle in a poly bag
	K-2: Tube containing powder reagent	1.1 g x 40 tubes/kit (5 tubes per one aluminum laminated packaging)
Color:	K-1: colorless (liquid)	
	K-2: white (powder), semi-transparent (polyethylene tube)	
Odor:	No odor	
pH:	7 (when added K-1 reagent, final measurement solution)	

Melting point, boiling point, flash point, ignition point, lower explosion limit, vapor pressure, density, specific gravity, solubility, Pow, kinetic 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 K-1 and K-2 reagents are shown below.

K-1 reagent

Silver nitrate (No data on solution is available):

Acute toxicity(Oral):

Based on a report of an LD_{50} value of 1,170 mg/kg for rats (IUCLID (2000)), it was classified in Category 4.

Skin corrosion/ irritation:

There is a description that this substance caused corrosivity to the skin (CICAD 44 (2003)). In addition, there is a report of chemical burns by contact with this substance in occupational exposure (ATSDR (1990)). From the above results, it was classified in Category 1. Moreover, this substance was classified as "C; R34" in the EU DSD classification, and as "Skin Corr. 1B H314" in the EU CLP classification.

Serious eye damage/ eye irritation:

There is a description that this substance caused severe corrosivity to the eyes (CICAD 44 (2003)). In addition, there is a report of chemical burns by contact with the eyes in occupational exposure (ATSDR (1990)). Additionally, this substance was classified in Category 1 for skin corrosion/irritation. From the above results, it was classified in Category 1. Moreover, this substance was classified as "C; R34" in the EU DSD classification, and as "Skin Corr. 1B H314" in the EU CLP classification.

Reproductive toxicity:

Classification not possible due to lack of data.

Besides, there are reports that in a test with pregnant monkeys administered by intrauterine injection, although vaginal bleeding and abortion were observed, the animals delivered normal offspring after subsequent remating (PATTY (6th, 2012), ACGIH (7th, 2001), ATSDR (1990)). Because this was not conducted by the general human exposure route, it was not used for classification.

From the above, it was classified as "Classification not possible" due to lack of data.

Besides, in the previous classification, it was classified in Category 2 on the basis that effects on the testis (necrosis of the seminiferous tubules, etc.) were observed by direct administration to the testis. However, it is described in IUCLID (2000) that this test was unreliable because it was not conducted either by general protocol or by the normal administration route, and because effects were not well documented. In addition, since there were only effects on the testis and reproductive effects were unknown, the classification was changed from Category 2 to "Classification not possible."

Specific target organ toxicity - Single exposure:

This substance was corrosive and irritating to the respiratory tract (ATSDR (1990), PATTY (6th, 2012)). In humans, there is a report of irritation to the respiratory tract mucosa by inhalation exposure to the dust and burning sensation and pain in the mouth, salivation, vomiting, abdominal pain, diarrhea, severe gastroenteritis, hypotension, reduced breathing rate, vertigo, convulsions, paralysis of the diaphragm muscle, coma, central nervous system disorder and death as oral acute poisoning symptoms (HSDB (Access on September 2014)). There were no data in experimental animals.

From the above, although there is a description showing effects on the central nervous system, it is only in HSDB, the information source of List 2, and the original source could not be confirmed, therefore, the central nervous system was not adopted. Additionally, in the previous classification, although the effects on the blood system from methemoglobinemia and cyanosis in experimental animals (Category 1 (hemal system)) were adopted using the information sources in List 3, the blood system was not adopted because no description showing effects on the blood system was found in List 1 and List 2 in humans and experimental animals, and original source could not be confirmed from information sources in List 3 shown in the previous classification.

Therefore, this substance was considered to be irritating to the respiratory tract, and it was classified in Category 3 (respiratory tract irritation).

Specific target organ toxicity - Repeated exposure:

There is a description that 25 out of 30 workers exposed to silver dust for less than 1 year to more than 10 years at a plant manufacturing silver nitrate and silver oxide complained of upper respiratory irritation symptoms (sneezing, running nose, nasal stuffiness, sore throat), and 10 of the 30 workers complained of abdominal pain (burning pain relieved by antacids) (ATSDR (1990), ACGIH (7th, 2001)). Of these, abdominal pain may be due to the effects of mucous membrane irritation by the oral ingestion of part of the dust, it was considered that it should not be adopted as the target organ because it was observed in a few workers (1/3 of the total), and other gastrointestinal symptoms such as diarrhea and vomiting were not described.

On the other hand, as for experimental animals, in a test in which rats were given this substance in drinking water at 222 mg Ag/kg/day (equivalent to 349.6 mg/kg/day) for 37 weeks, although increased mortality was observed after 23 weeks, there are no description of organs toxicity except for ocular argyria (ACGIH (7th, 2001)). In addition, there is a description that in a test in which rats were dosed by drinking water at 89 mg Ag/kg/day (equivalent to 140 mg/kg/day) for 9 months, enlargement of the left ventricle was observed (ATSDR (1990), ACGIH (7th, 2001)). However, there was no report of effects on the cardiovascular system in humans or other animal tests, and this result was considered to be unreliable (ATSDR (1990)). There were no other available data for classification in experimental animals.

From the above, it was classified in Category 1 (respiratory organs). Besides, although in the previous classification, "kidney" and "cardiovascular system" were adopted as target organs based on the data from the information source in List 3, "cardiovascular system" was deleted for the reason described above. As for kidney, although there was a concern about adverse effects on kidney function due to deposition of silver in the kidneys, there was no evidence in tests with experimental animals, and there were also no data which correlated the amount of silver exposure with renal dysfunction in humans in the findings in occupational exposure. Considering a description that the evidence of "kidney" as the target organ was insufficient (ATSDR (1990)), "kidney" was deleted from the target organ.

Other data: Not available

Water:

Acute toxicity: Not classified based on JIS Z 7252 appendix B. 1.3.6 a) 2).

Other data: Classification is not possible because of data lack.

K-2 reagent

Potassium periodate:

Skin corrosion/ irritation: Classified as Category 2

Serious eye damage/ eye irritation: Classified as Category 2A

Other data: Not available

Sodium sulfate:

Acute toxicity (Oral): Not classified

LD50 for rats: >10,000 mg/kg (SIDS (2006))

Skin corrosion/irritation: Not classified

[Rationale for the Classification]

Based on (1) and (2), it was classified as "Not classified."

[Evidence Data]

(1) In a skin irritation test according to OECD TG 404 with rabbits, it was concluded as not irritating (SIDS (2006), REACH registration dossier (Access on September 2019)).

(2) This substance is not irritating to the skin and slightly irritating to the eyes. Sensitising effects are highly unlikely (SIDS (2006)).

Serious eye damage/eye irritation: Category 2B

Based on (1) and (2), it was classified in Category 2B.

(1) In an eye irritation test according to OECD TG 405 with rabbits, it was concluded to be slightly irritating, and

all the effects were reversible within 7 days (SIDS (2006), REACH registration dossier (Access on September 2019)).
(2) This substance is not irritating to the skin and slightly irritating to the eyes. Sensitising effects are highly unlikely (SIDS (2006)).

Skin sensitization: Not classified
Based on (1) and (2), it was classified as "Not classified."
(1) In a skin sensitization test (maximization method) according to OECD TG 406 with guinea pigs, no skin reaction was observed, and it was concluded to be negative (REACH registration dossier (Accessed on September 2019)).
(2) This substance is not irritating to the skin and slightly irritating to the eyes. Sensitising effects are highly unlikely (SIDS (2006)).

Germ cell mutagenicity: Not classified
There is no in vivo data for this substance, however, based on the weight of evidence (WoE), according to (1), it was classified as "Not classified."
(1) As for in vitro, there are reports of negative results in a bacterial reverse mutation test and a mammalian cell chromosomal aberration test (SIDS (2006), Risk Assessment Report (Food additives)_Potassium sulfate (Food Safety Commission, 2013)). It is concluded, as a comprehensive decision, in the evaluation in Risk Assessment Report (Food additives) (Food Safety Commission, 2013) that the food additive "potassium sulfate (CAS RN 7778-80-5)" has no genotoxicity of any particular concern for living organisms since negative results were obtained in all tests using salts of sulfuric acid.

Specific target organ toxicity - Single exposure: Category 1 (gastrointestinal tract)
Based on (1), it was classified in Category 1 (gastrointestinal tract).
(1) This substance was once used as a laxative in humans for medical purposes in oral doses of about 300 mg/kg up to 20 g maximum, but it has been gradually abandoned due to severe diarrhea and abdominal cramping (SIDS (2006)).

Specific target organ toxicity - Repeated exposure: Not classified
Based on (1) and (2), it was classified as "Not classified" for the inhalation and oral routes.
(1) In a cross-sectional study among 119 male workers exposed to the dust of this substance for 2 months to 31 years, mean urinary excretion of inorganic sulfates exceeding 2.2 g/L in all workers was detected, and 30% of the workers excreted more than 3 g/day of inorganic sulfates. The only symptom indicated by the workers was nasal irritation and runny noses (SIDS (2006)).
(2) In a 4-week feeding study with male rats, no toxic effects were observed at up to the highest dose of ca. 2,000 mg/kg/day.

Polyethylene:
No toxicological information available.

GHS classification results of K-1and K-2 reagents as mixtures are shown below.

[Acute toxicity(Oral)]
K-1 reagent: Not classified based on application of the additivity formula.
K-2 reagent: Classification is not possible because of data lack.

[Skin corrosion/ irritation]
K-1 reagent: Classified as Category 2 (Warning, Causes skin irritation) because K-1 reagent contains ≥1% and <5% of silver nitrate.
K-2 reagent: Classification is not possible because of data lack.

[Serious eye damage/ eye irritation]
K-1 reagent: Classified as Category 2 (Warning, Causes serious eye irritation) because K-1 reagent contains ≥1% and <3% of silver nitrate.
K-2 reagent: Classified as Category 2B (Warning, Causes eye irritation) because K-2 reagent contains ≥3% of sodium sulfate.

[Specific target organ toxicity(single exposure)]
K-1 reagent: Not classified because K-1 reagent contains <20% of silver nitrate.
K-2 reagent: Classification as Category 2 (Warning, May cause damage to digestive tract.) because K-2 reagent contains ≥1 and <10% of sodium sulfate.

[Specific target organ toxicity(repeated exposure)]
K-1 reagent: Classified as Category 2 (Warning, May cause damage to respiratory organs through prolonged or repeated exposure) because K-1 reagent contains ≥1 and <10% of silver nitrate.
K-2 reagent: Classification is not possible because of data lack.

[Acute toxicity (Darmal)], [Acute toxicity (Inhalation)], [Respiratory or skin sensitization], [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Aspiration hazard]
Not classified or classifications are not possible because of data lack.

12. Ecological information

No data on mixture is available. Data on K-1and K-2 reagents are shown below.

K-1 reagent
Silver nitrate:
Hazardous to the aquatic environment, short-term (acute):
It was classified in Category 1 from 48-hour EC_{50} = 0.0014 mg/L (0.0009 mgAg/L) for crustacea (Daphnia magna) (CICADs 44, 2002).
Hazardous to the aquatic environment, long-term (chronic):
If chronic toxicity data are used, then it is classified in Category 1 due to unknown environmental dynamics of the inorganic compound, and 60-day LOEC = 0.00016 mg/L for fish (Oncorhynchus mykiss) (CICADs 44, 2002).
If acute toxicity data are used for a trophic level for which chronic toxicity data are not obtained, then it is classified in Category 1 due to unknown environmental dynamics of the inorganic compound, and 48-hour EC_{50} = 0.0014 mg/L (0.0009 mg Ag/L) for crustacea (Daphnia magna) (CICADs 44, 2002).
From the above results, it was classified in Category 1.
Harmful effects on the ozone layer: This substance is not listed in the Annexes to the Montreal Protocol.

K-2 reagent
Potassium periodate, Polyethylene: No eco-toxicological information available.
Sodium sulfate:
Hazardous to the aquatic environment, short-term (acute): Not classified
It was classified as "Not classified" from 72-hour EC50 = 1,584.583 mg/L for algae (Pseudokirchneriella subcapitata) (AQUIRE, 2019, Simmons, 2012), 48-hour EC50 = 3,150.21 mg/L for crustacea (Ceriodaphnia dubia) (AQUIRE, 2019, Soucek, 2007), and 96-hour LC50 = 7,960 mg/L for fish (Pimephales promelas) (AQUIRE, 2019, Mount, 1997).
Hazardous to the aquatic environment, long-term (chronic): Not classified
It was classified as "Not classified" from 72-hour NOEC = 1,060 mg SO4/L (a converted value equivalent to NaSO4: 1,265 mg/L) for algae (Pseudokirchneriella subcapitata), 7-day NOEC = 610 mg SO4/L (a converted value equivalent to NaSO4: 728 mg/L) for crustacea (Ceriodaphnia dubia), and 31-day NOEC = 205 mg SO4/L for fish (Oncorhynchus mykiss) (a converted value equivalent to NaSO4: 245 mg/L) (all, AQUIRE, 2019, Elphick, 2011), although environmental dynamics of the inorganic compound is unknown.

GHS classification results of K-1and K-2 reagents as mixtures are shown below.
[Hazardous to the aquatic environment, short-term (acute)]
K-1 reagent: Classified as Category 1 (Warning, Very toxic to aquatic life) based on application of the summation method.
K-2 reagent: Classification is not possible because of data lack.
[Hazardous to the aquatic environment, long-term (chronic)]
K-1 reagent: Classified as Category 1 (Warning, Very toxic to aquatic life with long lasting effects) based on application of the summation method.
K-2 reagent: Classification is not possible because of data lack.
[Harmful effects on the ozone layer]:
K-1 reagent and K-2 reagent: Classifications are not possible because each of the substances is not described in Annex to Montreal Protocol.

13. Disposal considerations

Liquid waste contains ca. 0.2 mg of Nitrate-nitrogen per measurement.
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:	1479
Proper shipping name:	Oxidizing solid, n.o.s. (applicable only potassium periodate)
UN classification:	Class 5.1 (Oxidizing substances)
Packing group:	III
Civil Aeronautics Act:	Same as above. Applicable as Excepted Quantities of Dangerous Goods.
Fire Service Act:	Not applicable

Total weight of the product: ca.140 g/kit

15. Regulatory information

Poisonous and Deleterious Substances Control Act: Not applicable
PRTR Act: Only silver nitrate is applicable as “Class I Designated Chemical Substances No. 82 Silver and its water-soluble compounds”.
Industrial Safety and Health Act: Applicable
This product contains more than 1% of silver nitrate.
“Cabinet order, article 18, shall be indicated the Name of the substances, #2”
“Cabinet order, article 18-2, shall be notified the Name of the substances, #2”
This product contains more than each of 1% of potassium periodate and sodium sulfate.
“Cabinet order, article 18, shall be indicated the Name of the substances, #2”
“Cabinet order, article 18-2, shall be notified the Name of the substances, #2”
Water Pollution Control Act: Applicable
Waste solution after measurement contains nitrate compound.
“Cabinet Order set forth in Item (26) of Article 2”.
Sewerage Act: Applicable.
Waste solution after measurement contains nitrate compound.
“Cabinet Order set forth in Item (1) of Article 9-5”.

16. Other information

Reference literature

NITE, GHS Classification, IDH26-B-111, R-052 Silver nitrate (I) (Revised) (2014)
NITE, GHS Classification, ID:m-nite-7757-82-6_v1 Sodium sulfate
Safety Data Sheet No. W01W0116-0416 JGHEJP, FUJIFILM Wako Pure Chemical Corporation. (2021.01.12)
Safety Data Sheet No. A5111003300, TOSOH CORPORATION (2023.9.27)
Koukuu Kikenbutsu Yusou Houreisyu, Ed. MLIT, HOUBUN SHORIN CO., LTD. (2019)
JIS Z 7252:2019 Classification of chemicals based on “Globally Harmonized System of Classification and Labelling of Chemicals (GHS)” (Japanese Industrial Standards Committee)
JIS Z 7253:2019 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.