

[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	K-1 reagent		K-2 reagent		
Chemical name	Silver nitrate	Water	Potassium periodate	Extender	Polyethylene
Content	< 2%	> 98%	< 2%	< 10%	> 88%
Chemical formula	AgNO ₃	H ₂ O	KIO ₄	—	(C ₂ H ₄) _n
METI No. (reference number under CSCL in Japan)	(1)-8	—	(1)-441	—	(6)-1
CAS No.	7761-88-8	7732-18-5	7790-21-8	—	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, cool, dry and dark place.

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)/m³

ACGIH (TLVs): TWA 0.01 mg (Ag)/m³
OSHA (PEL): TWA 0.01 mg (Ag)/m³ (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-rat LD₅₀ = 1,173 mg/kg, Intraperitoneal-rat LD₅₀ = 83 mg/kg
Oral-mouse LD₅₀ = 50 mg/kg, Intraperitoneal-mouse LD₅₀ = 17 mg/kg (RTECS)

Skin corrosion/ irritation: Guinea pig- corrosive (CERI hazard data collection, 2002).

Serious eye damage/ eye irritation:

Rabbit 1mg severe (RTECS), moderate to strong irritation (CERI hazard data collection, 2002).

Reproductive toxicity:

Causes effects on testis (necrosis of seminiferous tubule) (IUCLID, 2000).

Specific target organ toxicity (single exposure):

Causes acute respiratory irritation in humans (PATTY (2000)).

Cyanosis, diarrhea, increased self-movement and cramp in an animal test (CERI hazard data collection (2002)).

Methemoglobinemia in an animal test (ICSC (J) (1998)).

Specific target organ toxicity (repeated exposure):

Effects on lungs and kidneys, hardening of the arteries in humans (CERI hazard data collection (2002)).

Other data: Not available

Water:

Acute toxicity: Oral-rat LD₅₀ > 90mL/kg

Other data: Not available

K-2 reagent

Potassium periodate:

No data regarding health hazard is available.

Polyethylene:

Acute toxicity:

Oral: Rat LD₅₀ > 7,950 mg/kg

Carcinogenicity: IARC Group 3 (not classifiable as to carcinogenicity to humans).

Other data: Not available

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

[Acute toxicity (oral)]

- K-1 and K-2 reagents: Not classified based on application of additivity formula in all reagents.
- [Skin corrosion/ irritation]
K-1 reagent: Classified as Category 2 (Warning, Causes skin irritation.) because K-1 reagent contains more than or equal to 1% 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 2A (Warning, Causes serious eye irritation.) because K-1 reagent contains more than or equal to 1% of silver nitrate.
K-2 reagent: Classification is not possible because of data lack.
- [Reproductive toxicity]
K-1 reagent: Not classified because concentration of silver nitrate in K-1 reagent is less than 3%.
K-2 reagent: Classification is not possible because of data lack.
- [Specific target organ toxicity (single exposure)]
K-1 reagent: Classified as Category 2 (Warning, May cause damage to blood.) because K-1 reagent contains 1 to 10% of silver nitrate.
K-2 reagent: Classification is not possible because of data lack.
- [Specific target organ toxicity (repeated exposure)]
K-1 reagent: Classified as Category 2 (Warning, May cause damage to lungs, kidneys and cardiovascular system through prolonged or repeated exposure.) because K-1 reagent contains 1 to 10% of silver nitrate.
K-2 reagent: Classification is not possible because of data lack.
- [Respiratory or skin sensitization], [Germ cell mutagenicity], [Carcinogenicity], [Aspiration hazard]
Classifications are not possible because of data lack.

12. Ecological information

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

K-1 reagent

Silver nitrate:

Hazardous to aquatic environment Acute:

Crustacea (*Daphnia magna*): 48-h EC_{50} = 0.0013 mg/L (CERI hazard data collection, 2002)

Hazardous to the aquatic environment Chronic:

Metal compound and unknown behavior in water, having bio-accumulative potential: BCF = 600 (Data on existing chemical substances).

Other data: Not available

K-2 reagent

Potassium periodate, Polyethylene: No eco-toxicological information available.

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

[Hazardous to the aquatic environment acute]

K-1 reagent: Classified as Category 1 (Warning, Very toxic to aquatic life.) based on application of the additivity formula.

K-2 reagent: Classification is not possible because of data lack.

[Hazardous to the aquatic environment chronic]

K-1 reagent: Classified as Category 1 (Warning, Very toxic to aquatic life with long lasting effects.) based on application of the additivity formula.

K-2 reagent: Classifications are 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. 0.1 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 K-2 reagent)
UN classification: Class 5.1 (Oxidizing substances)
Packing group: III
Civil Aeronautics Act: Same as above. Applicable as Excepted Quantities of Dangerous Goods.

Poisonous and Deleterious Substances Control Act: Not applicable (This product is a preparation and is not applicable as a deleterious substance under the Act.)

Fire Service Act: Not applicable
Total weight of the product: ca.140 g/kit

15. Regulatory information

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:

This product contains more than 0.1% of silver nitrate and is applicable as "Cabinet order table 9, item 2, article 18, shall be indicated the Name of the substance (article 18-2) #634".

Water Pollution Control Act:

This product contains silver nitrate and is applicable as "Cabinet order article 2, No 26, ammonia, ammonium compounds, nitrate compounds and nitric compounds"

Sewerage act:

This product contains silver nitrate and is applicable as "Cabinet order article 9-5, No 1, ammonium nitrogen, nitrate and nitric nitrogen".

16. Other information

Reference literature

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Material Safety Data Sheet No.051110033, TOSOH CORPORATION (2004.07.09)
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)
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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.