Safety Data Sheet

Reference No. 1057

Issue: 1st March 2004
Revision: 1st April 2026

1. Chemical product and company identification

Product name PACKTEST Total Chromium Model WAK-Cr-T

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:

Acute toxicity (oral):	Category 4	(applicable only K-2 reagent)
Skin corrosion/irritation:	Category 1	(applicable K-1, K-2 and K-3 reagents)
Serious eye damage/eye irritation:	Category 1	(applicable K-1, K-2 and K-3 reagents)
Respiratory or skin sensitization:	Category 1 (respiratory and skin sensitization)	(applicable only K-2 reagent)
Toxic to reproduction	Category 2	(applicable only K-2 reagent)
Specific target organ toxicity (single exposure):		
	Category 2 (blood, whole body)	(applicable only K-2 reagent)
	Category 3 (respiratory irritation)	(applicable only K-2 reagent)
Specific target organ toxicity (repeated exposure):		
	Category 2 (blood)	(applicable only K-2reagent)

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, short-term (acute):		
	Category 1	(applicable only K-1 reagent)
	Category 3	(applicable only K-2 reagent)
Hazardous to the aquatic environment, long-term (chronic):		
	Category 1	(applicable only K-1 reagent)

For those environmental 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**]**

Harmful if swallowed. (applicable only K-2 reagent)
Causes severe skin burns and eye damage. (applicable K-1, K-2 and K-3 reagents)
Causes serious eye damage. (applicable K-1, K-2 and K-3 reagents)
May cause allergy or asthma symptoms or breathing difficulties if inhaled. (applicable only K-2 reagent)
May cause an allergic skin reaction. (applicable only K-2 reagent)
Suspected of damaging fertility or the unborn child. (applicable only K-2 reagent)
May cause damage to blood and whole body. (applicable only K-2 reagent)
May cause respiratory irritation. (applicable only K-2 reagent)
May cause damage to blood through prolonged or repeated exposure. (applicable only K-2 reagent)
Very toxic to aquatic life. (applicable only K-1 reagent)
Harmful to aquatic life. (applicable only K-2 reagent)
Very toxic to aquatic life with long lasting effects. (applicable only K-1 reagent)

[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	Sulfuric acid	Silver nitrate	Other (not regulated)	Water	Potassium peroxodisulfate	Potassium nitrate
Content	0.5 – 0.9 %	0.5 – 0.9 %	0.01 – 0.09 %	90 – 99 %	30 – 39 %	60 – 69 %
Chemical formula	H2SO4	AgNO3	–	H2O	K2S2O8	KNO3
METI No. (reference number under CSCL in Japan)	(1)-430	(1)-8	–	–	(1)-456	(1)-449
CAS No.	7664-93-9	7761-88-8	–	7732-18-5	7727-21-1	7757-79-1

Reagent name	K-3 reagent		
Chemical name	Sulfamic acid	Other (not regulated)	Polyethylene
Content	1 - 4.9 %	5 - 9.9 %	90 - 99 %
Chemical formula	H3NO3S	-	(C2H4)n
METI No. (reference number under CSCL in Japan)	(1)-402	-	(6)-1
CAS No.	5329-14-6	-	9002-88-4

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 by 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, drink plenty of milk or water 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 (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: Avoid contact of the reagents with eyes and skin. Do not ingest or inhale the reagents. It needs special attention because pHs of K-1 reagent and a sample solution after addition of K-1 reagent are lower than or equal to 2, acidic.
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: 1 mg/m^3 (only for 100% Sulfuric acid)
0.01 mg (Ag)/m^3 (only for Silver nitrate)
ACGIH (TLVs): TWA 0.2 mg/m^3 (only for 100% Sulfuric acid)
TWA 0.01 mg (Ag)/m^3 (only for Silver nitrate)
TWA 0.1 mg/m^3 (only for Potassium peroxodisulfate)
OSHA (PEL): air TWA 1 mg/m^3 (only for 100% Sulfuric acid)
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 60 mL x 1 poly-bottle in a poly bag
K-2: powder reagent 0.08 g x 40 poly-tubes in aluminum laminated packaging
K-3: 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),
K-3: white (powder), semi-transparent (polyethylene tube)
Odor: No odor
pH: < 2 (K-1, K-2, K-3 reagent, sample solution after addition of K-1 reagent)

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 each ingredient in K-1, K-2, K-3 reagents is shown below.

K-1 reagent

Concentrated sulfuric acid (no data on <1% solution is available):

Acute toxicity:

Oral-rat: LD_{50} = 2,140 mg/kg (SIDS, 2001) and death case in human ingestion (dose level not known).
Inhalation(dust-mist)-rat: 4Hr-LC_{50} = 0.375 mg/L, 1Hr-LC_{50} = 347 ppm (4Hr converted value 0.347 mg/L) (SIDS, 2001)

Skin corrosion/ irritation:

pH of concentrated sulfuric acid is $\leq$ 1 and is considered as corrosive according to the GHS classification criteria.

Serious eye damage/ eye irritation:

In a human accidental case, serious eye damage associated with melting of anterior eye chamber was observed (ATSDR, 1998). 5% solution: moderate and 10% solution: severe irritation in rabbit eyes (SIDS, 2001). pH of the substance is $\leq$ 2.

Skin sensitization:

No data on skin sensitization is available. Sulfuric acid has been industrially used for several tens of years and is well known as skin trouble because of its skin irritation, however no case is reported as a sensitization. No allergic reaction occurs although there is a large amount of sulfuric ions in human body. In allergic tests of metal sulfates, positive result were caused due to a metal allergy but negative by sulfuric acid this is supported by the negative result of zinc sulfate. Based on the above results, it can be concluded that sulfuric acid does not have allergic potential (SIDS, 1998).

Reproductive toxicity:

No toxicity to unborn child or teratogenic effects was reported at dose levels where no maternal toxicity were seen in inhalation test in rabbits and mice administered during fetal organ developmental stage (SIDS, 2001). It is reported that no reproductive toxicity is concerned because no effects on reproductive organs in both males and females were seen and dominant effects were due to primary irritation/corrosion in a combined chronic and carcinogenicity test (SIDS, 2001).

Specific target organ toxicity (single exposure):

In human cases, respiratory irritation such as cough and breath shortness were observed by inhalation exposure of low concentration levels (DEGOT, 2001). At high concentration level, in addition to acute effects such as cough, breath shortness and blood in the sputum, prolonged effects such as dysfunction of lung, fibrosing disease and emphysema were reported (ATSDR, 1998). Bleeding or dysfunctions of lungs are observed in a guinea pig 8-h inhalation test (ATSDR, 1998).

Specific target organ toxicity (repeated exposure):

Cell proliferation of throat mucosa was observed at dose levels within the guidance value of category 1 in a rat 28-day inhalation test (SIDS, 2001). A series of diseases in lungs and airways were reported in a guinea pig repeated (14-139-days) inhalation test at dose levels within the guidance value of category 1, such as edema of nasal septum, lung emphysema, atelectasis, hyperemia of bronchial tubes, edema, bleeding, blocked blood vessel. Furthermore, histo-pathological changes in lung bronchial tubes including hyperplasia and increased thickness were also observed in a 78-week monkey inhalation test at dose levels within the guidance value of category 1 (0.048 mg/L, 23.5 Hr/Day) (ATSDR, 1998).

Other data: Not available.

Silver nitrate:

Acute toxicity: Oral-rat: LD_{50} = 1,173 mg/kg (CERI hazard data collection 2001-57 (2002)).

Skin corrosion/ irritation:

“Corrosive” in a guinea pig skin irritation test (CERI hazard data collection 2001-57 (2002)).

Serious eye damage/ eye irritation:

The substance causes severe irritation and therefore is corrosive to skin because it is reported that “moderate to severe irritation” in a rabbit eye irritation test (CERI hazard data collection 2001-57 (2002)).

Reproductive toxicity:

Effects on testis (necrosis of seminiferous tubule) were observed (IUCLID, 2000).

Specific target organ toxicity (single exposure):

Causes acute respiratory irritation in humans (PATTY (4th, 2000)). Methemoglobinemia in an animal test (ICSC (J) (1998)). Cyanosis, diarrhea, increased self-movement and cramp in an animal test (CERI hazard data collection 2001-57 (2002)).

Taking into account the above findings, it is considered that blood system is a target organ and causes respiratory irritation.

Specific target organ toxicity (repeated exposure):

Effects on lungs and kidneys, hardening of the arteries in humans were reported (CERI hazard data collection 2001-57 (2002)), therefore respiratory organ, kidneys and cardiovascular system are considered as target organs.

Other data: Not available.

Water: Acute toxicity: Oral-rat: LD_{50} >90 mL/kg
Other data: Not available

K-2 reagent
Potassium peroxodisulfate:
Acute toxicity: Oral-rat: LD_{50} = 802 mg/kg, 1,130 mg/kg (NICNAS, 2001)
Dermal-rabbit: LD_{50} > 10,000 mg/kg (RTECS)
Inhalation (dust, mist)-rat: 1Hr-LC_{50} > 42.9 mg/L (4Hr-LC_{50} > 10.7 mg/L) (NICNAS, 2001)
Skin corrosion/ irritation:
Irritating dermatitis in occupational settings are reported. (ACGIH 7th (2001), NICNAS (2001)).
Respiratory sensitization:
Symptoms of asthma were induced after inhalation exposure in humans (NICNAS (2001)), and NICNAS (2001) concluded as a positive respiratory sensitizer.
Skin sensitization:
More than two positive cases in patch tests are reported (NICNAS (2001)), and NICNAS (2001) concluded as a positive skin sensitizer.
Specific target organ toxicity (single exposure):
It is reported that "depression, weak breathing, increased respiration rate" in rat single-dose test, and these symptoms are "recovered in 4 days". These symptoms are observed at dose levels within the guidance value of category 2 (SIDS(2005)).
In human cases, "nasal discharge, breathing difficulty" is reported (SIDS(2005)).
Other data: Not available

Potassium nitrate:
Acute toxicity:
Oral-rabbit: LD_{50} = 1,901 mg/kg (RTECS)
Oral-rat: LD_{50} = 3,540 mg/kg (effects on lungs, chest, respiratory organs. liver, kidneys, urinary bladder and urinary duct) (RTECS).
LD_{50} = 3,750 mg/kg (RTECS 2005, IUCLID 2000), LD_{50} = 3,015 mg/kg (IUCLID 2000)
Oral-mouse: LD_{50} = 50 mg/kg, Intraperitoneal-mouse: LD_{50} = 17 mg/kg (RTECS)
Skin corrosion/ irritation: Irritating (ICSC (J) (2001), HSFS (2004), SITTING 4th (2002)).
Serious eye damage/ eye irritation: Irritating (ICSC (J) (2001), HSFS (2004), SITTING 4th (2002)).
Reproductive toxicity:
Guinea pig-oral (drinking water): Increased incidence of abortion, dead case in unborn children (RTECS 2005) (IUCLID 2000) (HSDB 2005)
Rat-feeding study: Birth abnormality in a two generation reproductive test (IUCLID 2000) (HSDB 2005)
Specific target organ toxicity (single exposure):
Respiratory irritation (ICSC (J), 2001) (HSFS, 2004) (SITTING 4th 2002)
Production of methemoglobin (ICSC (J), 2001)(HSFS ,2004)(SITTING 4th 2002)
Rat-oral: Methemoglobinemia (RTECS, 2005)
Specific target organ toxicity (repeated exposure):
Humans-12 days oral administration: Methemoglobinemia (HSDB, 2005)
Other data: Not available

K-3 reagent
Polyethylene:
Acute toxicity: Oral-rat: LD_{50} > 7,950 mg/kg
Carcinogenicity: IARC Group 3 (not classifiable as to carcinogenicity to humans).
Other data: Not available

GHS classifications as a mixture of each K-1, K-2 and K-3 reagent are shown below.
[Acute toxicity (oral)]
K-2 reagent: Classified as Category 4 (Warning, Harmful if swallowed.) based on the application of additivity formula.
K-1 and K-3 reagents: Not classified based on the application of additivity formula.
[Skin corrosion/ irritation]
K-1, K-2 and K-3 reagents: Classified as Category 1 (Danger, Causes severe skin burns and eye damage.) because pHs of each reagent (mixture) is less than or equal to 2.
[Serious eye damage/ eye irritation]
Classified as Category 1 (Danger, Causes serious eye damage.) because of the same reason to the skin corrosion/ irritation.
[Respiratory or skin sensitization]
K-2 reagent: Classified as Category 1 (Danger, May cause allergy or asthma symptoms or breathing difficulties if inhaled, and may cause an allergic skin reaction.) because it contains more than or equal to 1% of potassium

peroxodisulfate.
Classification is not possible for other reagents because of data lack.

[Reproductive toxicity]
K-1 reagent: Not classified because concentrations of sulfuric acid and silver nitrate are less than 3%.
K-2 reagent: Classified as Category 2 (Warning, Suspected of damaging fertility or the unborn child.) because it contains more than or equal to 3% of potassium nitrate.
K-3 reagent: Classification is not possible because of data lack.

[Specific target organ toxicity (single exposure)]
K-1 reagent: Not classified because concentrations of sulfuric acid and silver nitrate are less than 1%.
K-2 reagent: Classified as Category 2 (Warning, May cause damage to blood and whole-body.) because it contains more than or equal to 10% of potassium nitrate and potassium peroxodisulfate.
K-2 reagent: Classified as Category 3 (Warning, May cause respiratory irritation.) because it contains more than or equal to 10% of each of potassium nitrate and potassium peroxodisulfate.
K-3 reagent: Classification is not possible because of data lack.

[Specific target organ toxicity (repeated exposure)]
K-1 reagent: Not classified because concentrations of sulfuric acid and silver nitrate are less than 1%.
K-2 reagent: Classified as Category 2 (Warning, May cause damage to blood through prolonged or repeated exposure.) because it contains more than or equal to 10% of potassium nitrate.
K-3 reagent: Classification is not possible because of data lack.

[Germ cell mutagenicity], [Carcinogenicity], [Aspiration hazard]
Not classified or classifications are not possible because of data lack.

12. Ecological information

No data on mixture is available. Data on each ingredient in K-1, K-2 and K-3 reagents is shown below.

K-1 reagent
Concentrated sulfuric acid:
Hazardous to the aquatic environment, short-term (acute):
Fish (bluegill): 96-hLC_{50} = 16-28 mg/L (SIDS, 2003)
Hazardous to the aquatic environment, long-term (chronic):
Toxicity may be caused because solutions become strong acid however it should be lowered in the environment due to buffering effects.

Silver nitrate:
Hazardous to the aquatic environment, short-term (acute):
Crustacea (*Daphnia magna*): 48-hEC_{50} = 0.0013 mg/L (CERI hazard data collection, 2002)
Hazardous to the aquatic environment, long-term (chronic):
Metal compound and unknown behavior in water, having bio-accumulative potential: BCF = 600 (Data on existing chemical substances).

K-2 reagent
Potassium peroxodisulfate:
Hazardous to the aquatic environment, short-term (acute):
Crustacea (*Daphnia magna*): 48-h EC_{50} = 92,000 µg/L (AQUIRE, 2003)
Hazardous to the aquatic environment, long-term (chronic):
Toxicity may be caused because solutions become strong acid however it should be lowered in the environment due to buffering effects.

Potassium nitrate:
Hazardous to the aquatic environment, short-term (acute):
Crustacea (*Daphnia magna*): 48-hTLm = 490 mg/L (IUCLID, 2000)
Hazardous to the aquatic environment, long-term (chronic):
Toxicity may be low since it is not water-insoluble (water solubility=1g/2.8mL(HSDB, 2004)) and its acute toxicity is low.

K-3 reagent
Polyethylene: No eco-toxicological information available.

GHS classifications as a mixture of each K-1, K-2 and K-3 reagent 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 the application of additivity

formula.
K-2 reagent: Classified as Category 3 (Harmful to aquatic life.) based on the application of additivity formula.
K-3 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 the application of additivity formula.
Other reagents: Classifications are not possible because of data lack.

[Harmful effects on the ozone layer]:
K-1, K-2 and K-3 reagents: Classifications are not possible because each of the substances is not described in Annex to Montreal Protocol.

13. Disposal considerations

pHs of remaining K-1 reagent and a sample solution after the addition of K-1 reagent are less than or equal to 2. Waste solution contains ca 5 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	3316
Proper shipping name:	Chemical Kit
UN classification:	Class 9 (miscellaneous dangerous substances and articles)
Packing group:	II
Civil Aeronautics Act:	Applicable as a dangerous air shipping product
Fire Service Act:	Not applicable
Total weight of the product:	ca.250 g/kit

15. Regulatory information

Poisonous and Deleterious Substances Control Act: Not applicable (Not considered as a deleterious substance under the act because the product is a preparation)

PRTR Act: K-2 reagent contains potassium peroxodisulfate and is applicable as “Class I Designated Substances No.395 Water-soluble salts of peroxodisulfuric acid”.

Industrial Safety and Health Act: Applicable
K-1 reagent contains more than 0.1% and less than 1% of silver nitrate.
: “Cabinet order, article 18-2, shall be indicated the Name of the substances, #2”
K-2 reagent contains more than 1% of potassium peroxodisulfate.
K-3 reagent contains more than 1% of potassium sulfamic acid.
: “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”

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”.

Waste Disposal and Cleaning Act:
pH of waste solutions after the measurement is less than or equal to 2 and is applicable as Special Controlled Industrial Waste under the act.

16. Other information

Reference literature

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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.