Safety Data Sheet

Reference No. 1058-3

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1. Chemical product and company identification

Product name PACKTEST Total Nitrogen (Inorganic) Model WAK-TN-i-3

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 and K-3 reagents)
Serious eye damage/eye irritation:	Category 1	(applicable K-1 and K-3 reagents)
	Category 2B	(applicable only K-2 reagent)
Reproductive toxicity:	Category 1	(applicable only K-3 reagent)
Specific target organ toxicity (single exposure):	Category 2 (respiratory organs)	(applicable only K-1 reagent)
Specific target organ toxicity (repeated exposure):	Category 2 (liver, lung)	(applicable only K-2 reagent)

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

Environmental hazards: 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 and K-3 reagents)
Causes serious eye damage.	(applicable K-1 and K-3 reagents)
Causes eye irritation	(applicable only K-2 reagent)
May damage fertility or the unborn child.	(applicable only K-3 reagent)
May cause damage to respiratory organs.	(applicable only K-1 reagent)
May cause damage to liver and lung through prolonged or repeated exposure.	(applicable only K-2 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	Sodium hydroxide	Other (not regulated)	Water	Devarda's Alloy*	Other (not regulated)
Content	1 – 4.9 %	0.1 – 0.49 %	90 – 99 %	5 – 9.9 %	90 – 99 %
Chemical formula	NaOH	–	H_2O	Cu,Al,Zn	–
METI No. (reference number under CSCL in Japan)	(1)-410	–	–	–	–
CAS No.	1310-73-2	–	7732-18-5	8049-11-4	–

* Devarda's alloy: An alloy of 50% copper, 45% aluminum and 5% zinc.

Reagent name	K-3 reagent			
Chemical name	Sodium Dichloroisocyanurate	Sodium Salicylate	Other (not regulated)	Polyethylene
Content	0.5 – 0.9 %	5 – 9.9 %	0.1 – 0.4 %	80 – 89 %
Chemical formula	$C_3N_3O_3Cl_2Na$	$C_7H_5O_3Na$	–	$(C_2H_4)_n$
METI No. (reference number under CSCL in Japan)	(5)-1043	(3)-1639	–	(6)-1
CAS No.	2893-78-9	54-21-7	–	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 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, 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 (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.
Concentrated waste solution should not be released into sewer or 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 K-1 reagent, test solution after addition of K-1 reagent and test solution after reacted K-3 reagent 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, 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: 2 mg/m^3 (only for 100% Sodium hydroxide)
ACGIH (TLVs): Ceiling, 2 mg/m^3 (only for 100% Sodium hydroxide)
OSHA(PEL): 8H, TWA, 2 mg/m^3 (only for 100% Sodium hydroxide)

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	0.06 g x 40 poly-tubes in a poly bag
	K-3: Tube containing powder reagent	1.1 g x 40 tubes/kit, aluminum laminated packaging each of 5 tubes
Color:	K-1: colorless (liquid), K-2: gray (powder), K-3: white (powder), transparent (polyethylene tube)	
Odor:	K-1: No odor, K-2: No odor, K-3: Chlorine like odor	
pH:	13 (K-1 reagent, test solution after addition of K-1 reagent, test solution after reacted K-3 reagent)	

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 K-1, K-2 and K-3 reagents are shown below.

K-1 reagent
Sodium hydroxide (no data on solution is available):
Sodium hydroxide
Acute toxicity: Oral- rabbits: LD_{50} 325 mg/kg (SIDS (2002)).
Skin corrosion/irritation:
In a pig test using application of 2N (8%), 4N (16%) and 6N (24%) solutions on the abdominal region, gross blisters developed within 15 minutes of application and the 8 and 16% solutions produced severe necrosis in all epidermal layers. The 24% concentration produced numerous and severe blisters with necrosis extending deeper into the subcutaneous tissue (SIDS (2009)). Additionally, there is a report that severe necrosis occurred after application of a 5% solution to the skin of rabbits for 4-hour (ACGIH (7th, 2001)). Based on these data, the substance was classified into Category 1. As relevant information, the pH is 12 (0.05% w/w) (Merck (14th, 2006)). For humans, 0.5 - 4% solutions were irritating to the skin, and in skin irritation tests with a 0.5% solution, 55% and 61% of the volunteers showed positive skin irritation reactions (SIDS (2009)). In EU classification, the substance is classified into C; R35.
Serious eye damage/eye irritation:
Based on a report that the corrosive concentration for rabbit eyes was 1.2% or higher than 2% (SIDS (2009)) and a pH of 12 (0.05% w/w) (Merck (14th, 2006)), the substance was classified into Category 1. For

humans, there are numerous case reports that the accidental exposure to high concentrations of dusts and solutions caused severe eye damage (ACGIH (7th, 2001)) and that accidental contact with the eye leads to blindness (DFGOT vol. 12 (1999)). As relevant information, the substance is corrosive to skin and classified into C; R35 in EU classification.

Skin sensitization:

Male volunteers were exposed on their backs to concentrations of 0.063 - 1.0% of the substance. After 7 days the volunteers were challenged to a concentration of 0.125%. The irritant response correlated well with the concentration, but an increased response was not observed when the previously patch tested sites were rechallenged. Based on these results, sodium hydroxide has no skin sensitization potential. Furthermore sodium hydroxide has been used widely and for a long time, and no human cases of skin sensitization were reported, therefore, sodium hydroxide is not considered to be a skin sensitizer (SIDS (2009)). Based on this conclusion, the substance was classified as "Not classified".

Germ cell mutagenicity:

In bone marrow micronucleus tests by intraperitoneal administration to mice (in vivo somatic cell mutagenicity test), a significant increase of micronuclei was not observed (SIDS (2009)). In addition, in an oocyte aneuploidy induction test by intraperitoneal administration to mice (in vivo germ cell mutagenicity test), any evidence that suggested a chromosome non-disjunction was not observed (SIDS (2009)). Since there findings indicate negative results for in vivo somatic cell and germ cell mutagenicity tests, the substance was classified as "Not classified". As relevant information, from in vitro mutagenicity tests, there are reports of a negative Ames test (SIDS (2009)) and a false-positive CHO K1 cell chromosomal aberration test (SIDS (2009)).

Carcinogenicity:

Although there is a report of a negative result in a rat carcinogenicity test by oral administration for 12 weeks (DFGOT vol. 12 (1999)), classification was not possible due to lack of sufficient data.

Specific target organ toxicity (single exposure):

Based on a report that acute exposures involving inhalation of dusts or mists may cause mucous membrane irritation with subsequent cough and dyspnea; and that intense exposure may result in pulmonary edema and shock (PATTY (5th, 2001)), the substance was classified into Category 1 (respiratory system). As relevant information, there is a report that dust formation is unlikely because of the substance's hygroscopic properties and negligible vapour pressure (SIDS (2009)). There is a report of 28 accidental ingestion cases in which approximately 50 - 200 mL of a 25 - 37% solution of the substance was ingested and injury to the upper gastrointestinal tract and esophagus was observed (SIDS (2009)). Additionally, there are numerous case report of serious accidental or suicidal poisoning in which the substances caused severe corrosion of mouth, throat, tongue and oesophagus (DFGOT vol. 12 (1999)).

Specific target organ toxicity (repeated exposure):

There is a report that no animal data are available for repeated dose toxicity tests by oral, dermal, inhalation and other routes of exposure for the substance (SIDS (2009)). There is very little human data available. Classification was not possible due to lack of data. There is a report that following repeated inhalation exposure to aerosols of the substance, rats suffered pulmonary damage (ACGIH (7th, 2001)). This data was not used as the basis of classification since the exposure concentrations are unknown. As relevant information, there is a report that dust formation is unlikely because of the hygroscopic properties and negligible vapour pressure of the substance (SIDS (2009)).

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

K-2 reagent

Devarda's Alloy:

Specific target organ toxicity (single exposure):

[Cu] Reported by ACGIH 7th(2001).

Specific target organ toxicity (repeated exposure):

[Cu] Reported by EHC 200(1998).

[Al] Reported by EHC 194(1997),PATTY 4th(1994),ATSDR(1999).

Other data: Not available

K-3 reagent

Sodium Dichloroisocyanurate

Acute toxicity: Oral-rats: LD_{50} 735 mg/kg, 1823 mg/kg (IUCLID (2000)), 1670 mg/kg (HSDB (2003))
Dermal-rats: LD_{50} >5000 mg/kg bw (IUCLID (2000))
Dermal-rabbits: LD_{50} >2000 mg/kg bw (IUCLID (2000))
Inhalation: Dusts and mists–rats: LC_{50} >50 mg/L/1h (12.5 mg/L/4h) (IUCLID (2000))

Skin corrosion/ irritation:
In a rabbit test by application to the skin for 24-hour, the test substance was determined to be a non-irritant to intact skin and a moderate to moderately severe irritant to abraded skin (HSDB (2003)). Additionally, it was reported that the substance was "moderate irritating" in another rabbit test (Draize test) (IUCLID (2000)). Based on these results and a report that application to wet skin or application of the solution can cause "severe irritation" (SITTIG (5th, 2008)), the substance was classified into Category 2.
Serious eye damage/irritation:
Application into the conjunctival sac of rabbits at a dose level of 10 mg showed dull irises and corneas, and erythema sufficient to make individual blood vessels not easily discernible within 1-hour. Iris congestion remained until the 7th day. The test substance was determined to be a moderately severe irritant. Additionally, the substance is classified into Xi; R36/37 in EU classification (EU-Annex I (access on Sep. 2009)). Based on these information, the substance was classified into Category 2A.
Specific target organ toxicity - Single exposure
In a rat acute oral toxicity test (dosage 1450 - 1925 mg/kg, LD50 = 1670 mg/kg), clinical signs including emaciation, weakness, lethargy, diarrhea and necropsy findings such as irritation of the gastrointestinal tract, tissue edema, and liver and kidney congestion were observed (HSDB (2003)). In a rabbit acute oral toxicity test (dosage: 1000 - 3000 mg/kg, minimal lethal dose: 2500 mg/kg), clinical signs including prostration, coma, salivation, lacrimation, labored breathing. Necropsy findings such as liver dysfunction, irritation of the digestive tract, and lung congestion were noted (HSDB (2003)). Based on a report that the oral toxicity is apparently due to corrosive action on the stomach (HSDB (2003)), these findings are considered to be systemic toxicity caused by the strong irritation to the digestive tract. Since death occurred at dose levels within the guidance value range for Category 2 and the affected organ cannot be identified, the substance was classified into Category 2 (systemic toxicity). In addition, based on reports of irritating to the upper respiratory tract, irritating to respiratory system or some bronchospasm as signs in human exposure (HSDB (2003)), the substance was classified into Category 3 (respiratory tract irritation).
Other data: Not available

Sodium Salicylate
Acute toxicity: Oral-rats: LD_{50} = 1,200 mg/kg
Serious eye damage/irritation: 2B
Other data: Not available

Polyethylene:
Acute toxicity: Oral-rats: Rat LD_{50} > 7,950 mg/kg (used 7,950 mg/kg for the calculation of ATEmix below)
Carcinogenicity: IARC Group 3 (not classifiable as to carcinogenicity to humans).
Other data: Not available

GHS classification results of K-1, K-2 and K-3 reagents as mixtures are shown below.
[Acute toxicity (oral)]
K-2 reagent: From LD_{50} values of ingredients.
Category 4 (Warning, Harmful if swallowed.)
[Skin corrosion/ irritation]
K-1 reagent, K-3 reagent: The pH of the mixture is ≥11.5.
Category 1 (Danger, Causes severe skin burns and eye damage.)
[Serious eye damage/ eye irritation]
K-1 reagent, K-3 reagent: The pH of the mixture is ≥11.5.
Category 1 (Danger, Causes serious eye damage.)
K-2 reagent The content of Category 2B substance is ≥10%.
Category 2B (Warning, Causes eye irritation)
[Reproductive toxicity]
K-3 reagent: The content of Category 1 substance is ≥0.3%.
Category 1 (Danger, May damage fertility or the unborn child.)
[Specific target organ toxicity (single exposure)]
K-1 reagent: The content of Category 1 (respiratory organs) substance is ≥1% and <10%.
Category 2 (Warning, May cause damage to respiratory organs.)
[Specific target organ toxicity (repeated exposure)]
K-2 reagent: The content of Category 1 substance is ≥1% and <10%.
Category 2
(Warning, May cause damage to liver and lung through prolonged or repeated exposure.)

K-1 reagent
[Acute toxicity], [Respiratory or skin sensitization], [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”.

K-2 reagent
[Acute toxicity (dermal, inhalation)], [Skin corrosion/ irritation], [Respiratory or skin sensitizer], [Germ cell mutagenicity], [Carcinogenicity], [Reproductive toxicity], [Specific target organ toxicity (single exposure)], [Aspiration hazard]
From the data of ingredients, above hazard classes are “Not classified” or “Classification not possible”.

K-3 reagent
[Acute toxicity], [Respiratory or skin sensitization], [Germ cell mutagenicity], [Carcinogenicity], [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 K-1, K-2 and K-3 reagents are shown below.

K-1 reagent
Sodium hydroxide:
Hazardous to the aquatic environment, short-term (acute):
Classified into Category 3 from its 48h-LC_{50} = 40 mg/L for Crustacea (*Cenodaphnia quadrangular*) (SIDS, 2004, etc).
Hazardous to the aquatic environment, long-term (chronic):
Classified into Not classified since the toxicity is mitigated in environmental water by buffer action though it is considered to be a factor of toxicity that water solution becomes a strong base.

K-2 reagent
Devarda's Alloy:
Bioaccumulation potential: L(E)C_{50}≦100mg/L
Other data: Not available

K-3 reagent
Sodium Dichloroisocyanurate
Hazardous to the aquatic environment, short-term (acute):
Classified into Category 1 from its 48h-EC_{50} = 0.11 mg/L for Crustacea (Daphnia magna) (AQUIRE, 2010).
Hazardous to the aquatic environment, long-term (chronic):
Classified into Category 1 since its acute toxicity is Category 1 and it is not rapidly degradable (BIOWIN).
No eco-toxicological data available; Sodium Salicylate and Polyethylene.

GHS classification results of K-1, K-2 and K-3 reagents as each of a mixture are shown below.
[Hazardous to the aquatic environment, short-term (acute)]
K-1 reagent: Not classified
K-2 reagent: Classification is not possible because of data lack
K-3 reagent: Not classified
[Hazardous to the aquatic environment, long-term (chronic)]
K-1 reagent: Not classified
K-2 reagent: Not classified
K-3 reagent: Not classified
[Harmful effects on the ozone layer]:
Classification is not possible because each of the substances is not described in Annex to Montreal Protocol.

13. Disposal considerations

The pH level of remaining K-1 reagent, test solution after adding of K-1 reagent, and waste solution after reacted K-3 reagent will be alkaline of 13. Please note that after adding the K-2 reagent, part of Devarda’s Alloy will be dissolved into the solution, so it is highly recommend to follow the appropriate method especially for the industrial use.
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:	3266
Proper shipping name:	Corrosive liquid, basic, inorganic, n.o.s. (applicable only K-1 reagent)
UN classification:	Class 8 (Corrosives)
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.250 g/kit

15. Regulatory information

Poisonous and Deleterious Substances Control Act:
Not applicable. (This product contains less than 5% of sodium hydroxide and is not applicable as a deleterious substance under the Act.)

PRTR Act: Not applicable

Industrial Safety and Health Act: Applicable
K-1 reagent contains more than 1% of sodium hydroxide.
K-2 reagent contains more than 0.1% of Copper and Aluminum, respectively.
: “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 K-1 reagent, waste solution after addition of K-1 reagent and waste solution after reacted K-3 reagent are higher than or equal to 12.5, applicable as a “Special Controlled Industrial Waste” under the Act.

16. Other information

Reference literature

15,911 no Kagaku Shouhin, The Chemical Diary Co., Ltd. (2011)
NITE, GHS Classification Database, ID21B3010 Sodium hydroxide (FY2009)
Safety Data Sheet No. W01W0104-1670 JGHEJP, Wako Pure Chemical Industries, Ltd. (2015.01.08)
Safety Data Sheet Devarda's Alloy (Q2L01-Cu11-6), Kansai Catalyst Co., Ltd. (2017.06.01)
NITE, GHS Classification Database, ID21A3717 (FY2009)
Safety Data Sheet No. W01W0119-0314 JGHEJP, Wako Pure Chemical Industries, Ltd. (2014.08.18)
Material Safety Data Sheet No.051110033, TOSOH CORPORATION (2004.07.09)
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.