

[Hazard statements]

Harmful if inhaled	(applicable only K-1 reagent)
Causes severe skin burns and eye damage	(applicable K-1 and K-2 reagents)
Causes serious eye damage	(applicable K-1 and K-2 reagents)
Suspected of causing cancer	(applicable only K-1 reagent)
Suspected of damaging fertility or the unborn child	(applicable K-1 and K-2 reagents)
May cause damage to respiratory systems	(applicable only K-1 reagent)
May cause damage to nervous system	(applicable only K-2 reagent)
May cause damage to gastrointestinal tract	(applicable only K-3 reagent)
May cause damage to respiratory systems through prolonged or repeated exposure	(applicable only K-1 reagent)
May cause damage to urinary system through prolonged or repeated exposure	(applicable only K-2 reagent)
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		
Chemical name	Sulfuric acid	Ammonium Molybdate Tetrahydrate	Water
Content	5 - 9.9 %	1 - 4.9 %	80 - 89 %
Chemical formula	H ₂ SO ₄	(NH ₄) ₆ Mo ₇ O ₂₄ ·4H ₂ O	H ₂ O
METI No. (reference number under CSCL in Japan)	(1)-430	(1)-389	-
CAS No.	7664-93-9	12054-85-2	7732-18-5

Reagent name	K-2 reagent		K-3 reagent		
Chemical name	Oxalic acid	Water	Sodium Sulfate	Other (not regulated)	Polyethylene
Content	1 - 4.9 %	90 - 99 %	5 - 9.9 %	0.5 - 0.9 %	90 - 99 %
Chemical formula	C ₂ H ₂ O ₄	H ₂ O	Na ₂ SO ₄	-	(C ₂ H ₄) _n
METI No. (reference number under CSCL in Japan)	(2)-844	-	(1)-501	-	(6)-1
CAS No.	144-62-7	7732-18-5	7757-82-6	-	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 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.
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.
Due to the pH levels of K-1 reagent, K-2 reagent, and sample solution after adding the reagents are acidic of ≤ 2 , 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: 1 mg/ m³ (only for 100% Sulfuric acid)
ACGIH (TLVs): TWA 1 mg/ m³ (only for 100% Sulfuric acid)
OSHA (PEL): air TWA 1 mg/ m³ (only for 100% Sulfuric acid)
ACGIH (TLVs): TWA 5 mg(Mo)/m³ (only for Ammonium molybdate tetrahydrate)
OSHA (PEL): air TWA 5 mg(Mo)/m³ (only for Ammonium molybdate tetrahydrate)

Protective equipment: Recommended to wear protective glasses and gloves.

9. Physical and chemical properties

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

Melting point, boiling point, flash point, ignition point, lower explosion limit, vapor pressure, density, relative density, 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, K-2, and K-3 reagents are shown below.

K-1 reagent

Sulfuric acid:

Acute toxicity (Oral):

It was set as Category 5 based on rat LD50 value: 2140mg/kg (SIDS, 2001) and description that there is a report of deaths by the ingested doses (amount of ingested doses is unknown) in humans.

Acute toxicity (Inhalation: Dusts and mists):

Based on rat LC50 value (4 hour exposure): 0.375mg/L (1-hour exposure) and : 347ppm (4 hour equivalent: 0.347mg/L) (all are (SIDS and 2001)), it was set as Category 2.

Skin corrosion /irritation:

According to the classification by the government, it is "Category 1A-1C" for the following reasons, but it was classified as Category 1 by NITE.

Since pH of concentrated sulfuric acid was 1 or less, it was judged to be a corrosive substances with the GHS classification standards, and classified as Category 1A-1C.

Serious eye damage/eye irritation:

From description that the critical damage to the eye accompanied by solutions of anterior chamber of eye was acknowledged in example of accident in human (ATSDR, 1998), and from description that moderate irritation with 5% liquid and severe irritation with 10% liquid were acknowledged to the eye of a rabbit (SIDS, 2001), and since pH of this product was two or less. So it was set as Category 1.

Skin sensitization:

There is no test data on skin sensitizing of sulfuric acids. Although sulfuric acid has been industrially used for several decades, there is no case report of skin sensitization, while skin injuries by skin irritation is well known. Although an extensive amount of sulfate ion exists internally (the sulfate ion in serum being 33 mmol/L and 50 times that in cells), allergic reactions do not occur. In metal study of allergic aspermatogenic sulfate, even if allergy positive with metal may occur, sulfuric ion is presumed to result in allergic negative as is suggested by the negative results in sulfate of zinc. Based on the description that a conclusion is drawn from the results mentioned above that sulfate does not cause allergy to humans(SIDS, 1998).Therefore it was put outside of the Category.

Reproductive toxicity:

Since it is not observed of fetotoxicity and teratogenicity at the dose causing no maternal toxicity in inhalation test fetal period organogenesis rabbit and mouse (SIDS, 2001) and it was judged of no concern of reproductive toxicity because in chronic toxicity study and carcinogenicity tests, the effects on the reproductive organ of both sexes is not observed and the effect by irritation/caustic is main toxicity directly (SIDS, 2001), it was considered as on the outside of Category.

Specific target organ toxicity - Single exposure:

Based on the descriptions that in the inhalation exposure of low concentration by humans, airway irritation such as cough and breath shortness is identified (DFGOT, 2001), and at high exposure levels, acute effects such as cough, breath shortness and hemoptysis shedding etc., and permanent effects such as functional depression of lungs, fibrosis and emphysema were identified (ATSDR, 1998), and that hemorrhage in lungs and dysfunction were identified by 8-hour inhalation exposure in guinea pigs (ATSDR, 1998). So it was referred to as Category 1 (respiratory systems).

Specific target organ toxicity - Repeated exposure:

In the 28-day inhalation exposure test using rat, cell proliferation in laryngeal mucosa is acknowledged in guidance value of Category 1(SIDS (2001)), and in the 14 to 139-day repetition inhalation exposure test using the guinea pigs of the concentration of guidance value within the limits of Category 1, respiratory and lung disorder, such as nasal-septum dropsy, pulmonary emphysema, atelectasis, hyperemia, dropsy, bleeding and thrombosis of bronchioles are recognized (ATSDR(1998)), and further in the 78-week inhalation exposure test using a cynomolgus, histological change as hyperplasia of a cell, the wall thickening, etc. in bronchioles of lungs was acknowledged in the dosage (0.048 mg/L, 23.5 Hr/Day) of the range of the guidance value of Category 1, so it was classified to as Category 1 (respiratory systems).

Other: Classification is not possible because of data lack.

Ammonium Molybdate Tetrahydrate:

Data on the tetrahydrate is not available. Data on the non-hydrate (CAS No. 12027-67-7) is shown below.

Acute toxicity (Oral):

From a reported LD50 value of 680 mg/kg for rats (Result of the initial environmental risk assessment of chemicals, Vol. 10, Ministry of the Environment in Japan (2012)), it was classified in Category 4.

Serious eye damage/eye irritation:

From the information that this substance is irritating to animal eyes, it was classified in Category 2 (HSDB (Access on September 2015)).

Carcinogenicity:

There is no carcinogenicity information on this substance itself. However, as mentioned in this hazard class of sodium molybdate (CAS number: 7631-95-0), ACGIH classified soluble molybdenum compounds in A3 in carcinogenicity assessment based on the carcinogenicity test results using molybdenum trioxide and so on

(ACGIH (7th, 2003)). Because this substance corresponds to a soluble molybdenum compound (ACGIH (7th, 2003)), it is thought that the ACGIH's carcinogenicity classification result is applicable. Therefore, the substance was classified in Category 2 in this hazard class.

Reproductive toxicity:

There is no reproductive effect information on this substance in either humans or experimental animals. However, this substance belongs to a soluble molybdenum compound and the classification based on the toxicity information of sodium molybdate (CAS number: 7631-95-0) is possible, and it is considered to be appropriate to apply its classification result. Therefore, this substance was classified in Category 2 in this hazard class.

Specific target organ toxicity - Single exposure:

Because this substance is irritating to the respiratory tract (DFGOT vol. 18 (2002), ACGIH (7th, 2003)), it was classified in Category 3 (respiratory tract irritation).

Specific target organ toxicity - Repeated exposure:

No human data. As for experimental animals, in a 8-week gavage administration toxicity test using rats, weight gain reduction, decreased absolute kidney weight, increased relative kidney weight, increased urine volume, increased creatinine in urine, decreased creatinine clearance, and increased excretion of urinary deviation enzyme (kallikrein) from distal tubule were observed at 80 mg/kg/day (converted to a 90-day equivalent: about 50 mg/kg/day) within a range of Category 2 (Result of the initial environmental risk assessment of chemicals, Vol. 10, Ministry of the Environment in Japan (2012)). Due to no organic change but effects on function found in the kidney for this substance and an organic change observed for sodium molybdate, an analog substance, this substance was classified in Category 2 (kidney).

Other: Classification is not possible because of data lack.

Water:

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

Other: Classification is not possible because of data lack.

K-2 reagent

Oxalic acid:

Acute toxicity (Oral):

There are 3 reports of LD₅₀ values for rats: 475 mg/kg (males), 375 mg/kg (females) (PATTY (6th, 2012), ACGIH (7th, 2015)) and 7,500 mg/kg (PATTY (6th, 2012), EPA RED (1992)). Since two cases correspond to Category 4 and one case corresponds to "Not classified," this substance was classified in Category 4, which has the largest number of cases.

Acute toxicity (Dermal):

Based on an LD₅₀ value of 20,000 mg/kg (not lethal) for rabbits (PATTY (6th, 2012)), this substance was classified as "Not classified."

Acute toxicity (Inhalation: Gases):

Not applicable. Solid (GHS definition).

Skin corrosion /irritation:

In a test using rabbits given 500 mg of this substance by applying to the skin, mild irritation was observed (ACGIH (2015)). Also, this substance was irritating to the skin in humans (ACGIH (2001), PATTY (6th, 2012)). Therefore, this substance was classified in Category 2.

Serious eye damage /eye irritation:

In an eye irritation test applying 100 mg of this substance to the rabbit eyes, severe irritation was observed (PATTY (6th, 2012)). Also, eye irritation and corrosion in humans are reported (PATTY (6th, 2012)). Therefore, this substance was classified in Category 1.

Germ cell mutagenicity:

Classification not possible due to lack of data. There are no in vivo data. As for in vitro data, the bacterial reverse mutation test was negative (PATTY (6th, 2012), NTP DB (Access on June 2016)).

Reproductive toxicity:

In an 18-week continuous breeding study using mice administered by the oral route (in drinking water), it is reported that, at the high dose of 2,000 ppm (approx. 275 mg/kg/day) group, an increase in kidney weight and in abnormal sperm count was observed in F1 parent animals, and a decrease in the number of live fetuses and live female pups was observed in F2 animals (ACGIH (7th, 2015), PATTY (6th, 2012)). Therefore, this substance was classified in Category 2.

Specific target organ toxicity - single exposure:

This substance binds to calcium in the blood, leading to hypocalcemia, affecting the nervous system (ACGIH (7th, 2015)). In humans, signs and symptoms including burning pain in the throat and stomach; esophageal erosion; nausea; vomiting; severe hypotension; weak and irregular pulse; headaches; weakness; convulsions; coma; and death by accidental or intentional ingestion of this substance are reported (ACGIH (7th, 2001, 2015), PATTY (6th, 2012)). Also, it is described that irritation of the respiratory tract and ulceration of mucous membranes are produced by inhalation of this substance (HSDB (Access on June 2016)). From the above, this substance was classified in Category 1 (nervous system) and Category 3 (respiratory tract irritation). In the previous classification, this substance was classified in Category 2 (respiratory organs) based on a description that respiratory tract corrosion and pulmonary oedemas by inhalation of this substance were pointed out in humans (ICSC(J) (1996)). However, ICSC is listed as List 3

in the current GHS classification guidance for the Japanese Government, therefore, the classification was revised.

Specific target organ toxicity - repeated exposure:

As for humans, in Norwegian railroad workers (393, male) who responded in questionnaires regarding the prevalence of urinary stones, the reports of urinary stone colic increased depending on the categorization of exposure concentrations (ACGIH (7th, 2015), PATTY (6th, 2012)). There is no information on experimental animals. Therefore, this substance was classified in Category 1 (urinary system).

Other: Classification is not possible because of data lack.

Water: Same as above.

K-3 reagent

Polyethylene:

Acute toxicity: Not classified; Not acute toxic to human; Rat-LD₅₀ > 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 reagents are shown below.

[Acute toxicity (Oral)]

Each reagent is not classified based on application of the additive equation.

[Acute toxicity (Dermal)]

K-2: Not classified based on application of the additive equation.

K-1, K-3: Classification is not possible because of data lack.

[Acute toxicity (Inhalation: Gases):

K-2: Not classified based on application of the additive equation.

K-1, K-3: Classification is not possible because of data lack.

[Acute toxicity (Inhalation: Dusts and mists)]:

K-1: Classified as Category 4 (Warning, Harmful if inhaled.) based on the application of additivity formula.

K-2, K-3: Classification is not possible because of data lack.

[Skin corrosion /irritation]

K-1, K-2: pH ≤ 2; classified Category 1 (Danger, Causes severe skin burns and eye damage).

K-3: Classification is not possible because of data lack.

[Serious eye damage /eye irritation]

K-1, K-2: pH ≤ 2; classified Category 1 (Danger, Causes serious eye damage).

K-3: Classification is not possible because of data lack.

[Carcinogenicity]

K-1: The content of Category 2 is ≥ 1%; classified Category 2 (Warning, Suspected of causing cancer).

K-2, K-3: Classification is not possible because of data lack.

[Reproductive toxicity]

K-1, K-2: The content of Category 2 is ≥ 3%; classified Category 2 (Warning, Suspected of damaging fertility or the unborn child).

K-3: Classification is not possible because of data lack.

[Specific target organ toxicity - single exposure]

K-1: The content of Category 1 (respiratory systems) is ≥ 1% and < 10%; classified Category 2 (Warning, May cause damage to respiratory systems).

The content of Category 3 (Respiratory tract irritation) is < 20%.

K-2: The content of Category 1 (nervous system) is ≥ 1% and < 10%; classified Category 2 (Warning, May cause damage to nervous system).

The content of Category 3 (Respiratory tract irritation) is < 20%.

K-3: The content of Category 1 (gastrointestinal tract) as other reagent is ≥ 1% and < 10%; classified Category 2 (Warning, May cause damage to gastrointestinal tract).

[Specific target organ toxicity - repeated exposure]

K-1: The content of Category 1 (respiratory systems) is ≥ 1% and < 10%; classified Category 2 (Warning, May cause damage to respiratory systems through prolonged or repeated exposure).

The content of Category 2 (kidney) is < 10%.

K-2: The content of Category 1 (urinary system) is ≥ 1% and < 10%; classified Category 2 (Warning, May cause damage to urinary system through prolonged or repeated exposure).

K-3: Classification is not possible because of data lack.

[Acute toxicity (Inhalation: Vapours)], [Respiratory sensitization], [Skin sensitization], [Germ cell mutagenicity], [Aspiration hazard]

Classification is not possible because of data lack.

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

Sulfuric acid:

Hazardous to the aquatic environment, short-term (Acute):

It was classified in Category 3 from 96-hour LC50 (pH 3.25-3.5) = 6-28 mg/L for fish (*Lepomis macrochirus*) (OECD SIDS: 2001).

Hazardous to the aquatic environment, long-term (Chronic):

If chronic toxicity data are used, then it is classified in Category 1 from 45-day NOEC (growth) (pH6.0) = 0.025 mg/L for fish (*Jordanella floridae*) (OECD SIDS: 2001) despite unknown environmental dynamics of the inorganic compound. Data in the species cannot be used for classification originally because it is ovoviviparous. However, the data were used because the growth effects of the substance were large, and toxicity of similar or more than that is expected for other fish species.

If acute toxicity data are used for a trophic level for which chronic toxicity data are not obtained, then it is classified in Category 3 from 24-hour LC50 = 29 mg/L for crustacea (*Daphnia magna*) (OECD SIDS: 2001) despite unknown environmental dynamics of the inorganic compound.

From the above results, it was classified in Category 1.

Hazardous to the ozone layer:

This substance is not listed in Annexes to the Montreal Protocol.

Ammonium Molybdate Tetrahydrate:

Data on the tetrahydrate is not available. Data on the non-hydrate (CAS No. 12027-67-7) is shown below.

No eco-toxicological information available.

Water:

Hazardous to the aquatic environment, short-term (Acute): Not applicable

Hazardous to the aquatic environment, long-term (Chronic): Not applicable

Hazardous to the ozone layer:

This substance is not listed in Annexes to the Montreal Protocol.

K-2 reagent

Oxalic acid:

Hazardous to the aquatic environment, short-term (Acute):

From 48-hour EC50 = 15 mg/L for crustacea (*Daphnia magna*) (Results of Aquatic Toxicity Tests of Chemicals conducted by Environment Agency in Japan (Environment Agency, 1998)), it was classified in Category 3.

Hazardous to the aquatic environment, long-term (Chronic):

If chronic toxicity data are used, then it is classified as "Not classified" due to being not rapidly degradable (a degradation rate by BOD: 37 % (Biodegradation and Bioconcentration Results of Existing Chemical Substances under the Chemical Substances Control Law, 1993)), 72-hour NOEC (r) = 9.4 mg/L for algae (*Pseudokirchneriella subcapitata*), and 21-day NOEC (reproduction) = 9.3 mg/L for crustacea (*Daphnia magna*) (both Results of Aquatic Toxicity Tests of Chemicals conducted by Environment Agency in Japan (Environment Agency, 1998)). If acute toxicity data are used for a trophic level for which chronic toxicity data are not obtained, then it is classified in Category 3 due to being not rapidly degradable (a degradation rate by BOD: 37 % (Biodegradation and Bioconcentration Results of Existing Chemical Substances under the Chemical Substances Control Law, 1993)), and 96-hour LC50 = 27 mg/L for fish (*Oryzias latipes*) (Results of Aquatic Toxicity Tests of Chemicals conducted by Environment Agency in Japan (Environment Agency, 1998)). It was classified in Category 3 by drawing a comparison between the above results.

Hazardous to the ozone layer:

This substance is not listed in Annexes to the Montreal Protocol.

Water: Same as above.

K-3 reagent

Polyethylene: No eco-toxicological information available.

GHS classifications as a mixture of each K-1, K-2, and K-3 reagents are shown below.

[Hazardous to the aquatic environment, short-term (Acute)]

K-1: Classification is not possible because of data lack.

K-2: Not classified based on application of the additive method.

K-3: Classification is not possible because of data lack.

[Hazardous to the aquatic environment, long-term (Chronic)]

K-1: Classified as Category 2 (Toxic to aquatic life with long lasting effects.) based on the application of additivity formula.

K-2: Not classified based on application of the additive method.

K-3: Classification is not possible because of data lack.
[Harmful effects on the ozone layer]
Classification is not possible because each of the component is not described in Annex to Montreal Protocol.

13. Disposal considerations

The pH levels of remaining K-1 and K-2 reagents, and waste solution after the measurement are acidic of ≤ 2 . 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 Limited 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 (Sulfuric acid and Oxalic acid in this product is < 10%)

PRTR Act:

K-1 reagent contains $\geq 1\%$ of Ammonium Molybdate Tetrahydrate; applicable as below.

"Class 1 designated chemical substances No. 453 molybdenum and its compounds".

Industrial Safety and Health Act:

K-1 reagent contains $\geq 1\%$ of Sulfuric acid and Ammonium Molybdate Tetrahydrate; applicable as below.

"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"

"Designated substances class 3"

K-2 reagent contains $\geq 1\%$ of Oxalic Acid; applicable as below.

"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"

K-3 reagent contains $\geq 1\%$ of Sodium Sulfate; applicable as below.

"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"

Waste Disposal and Cleaning Act:

The pH levels of remaining K-1 and K-2 reagents, and waste solution after the measurement are acidic of ≤ 2 ; applicable as "Special Controlled Industrial Waste" under the act.

16. Other information

Reference literature

NITE, GHS Classification, ID m-nite-12027-67-7_v1, Ammonium molybdate (version_1)

NITE, GHS Classification, ID m-nite-7664-93-9, Sulfuric acid (version_1)

NITE, GHS Classification, ID H28-B-037, C-048B, Oxalic acid (2018.01)

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

Koukuu Kikenbutsu Yusou Houeisyu, 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-Labeling 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.