



SAFETY DATASHEET (SDS)

According to JIS Z 7253:2019

Revision Date 17-Sep-2021

Version SDS-501+EX-01

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	Smoke tube
Product code	501
Manufacturer	GASTEC CORPORATION 8-8-6 Fukayanaka, Ayase-city, Kanagawa 252-1195, Japan
Emergency telephone number	+81-467 - 79 - 3910 +81-467 - 79 - 3979
Recommended uses and restrictions on use	Determining gas flow direction in smoke

2. HAZARDS IDENTIFICATION

The product is a porous material in which chemicals are adsorbed is sealed in a glass tube. Classification was performed on substances generated in handling this product.

GHS CLASSIFICATION

Physical Dangers

Harmful to Health

Acute Toxicity- oral	Category 3
Acute Toxicity- inhalation (gas)	Category 3
Acute Toxicity- inhalation (dusts and mists)	Category 2
Skin corrosive/irritation	Category 1
Serious eye damage/ eye irritation	Category 1
Sensitization respiratory	Category 1
Specific Organ Target/Systemic Toxicity (Single Exposure)	Category 1 (respiratory system)
Specific Organ Target/Systemic Toxicity (Repeated Exposure)	Category 1 (respiratory system, tooth, lung)
Environmental Hazards	
Acute Aquatic Hazards	Category 1
Chronic Aquatic Hazards	—

HAZARDS SYMBOL



Signal word

DANGER

Hazard statements

- H301 Toxic if swallowed.
- H330 Toxic if inhaled.
- H331 Fatal if inhaled.
- H314 Causes severe skin burns and eye damage
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H370 Causes damage to organs (respiratory system).
- H372 Causes damage to organs, through prolonged or repeated exposure(tooth, respiratory system, lung).
- H400 Very toxic to aquatic life.

Precautionary statement

Safety Precautions

Do not inhale smoke generated from the tube.
 Wash hands thoroughly handling.
 Do not eat, drink or smoke when using this protect
 Use only outdoors or in a well-ventilated area.
 Do not use smoke in the vicinity of precision equipment or electronic equipment as it corrodes metal.
 Do not generate smoke toward humans.
 When breaking off both ends of the tube, keep the tube away from the eye to prevent injury.
 Do not touch broken glasses and reagents with bare hands.
 Wear protective gloves/protective clothing/eye protection/face protection
 Avoid release to the environment.

Emergency Procedures

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER or doctor/physician.
 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a POISON CENTER or doctor/physician.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
 IF exposed: Call a POISON CENTER or doctor/physician.
 Wash contaminated clothing before reuse.
 Collect spillage.

Storage

The tube should be stored in a cool and dark place. The attached cap is for temporary storage and should not be used for long-term storage. Do not store with rubber balls attached. Do not store with precision instruments or electronic products.

Disposal

Dispose of the tube after being immersed in a lot of water (e.g. 1L) or after all the reagents are consumed.
 When the tube is broken, employ 'ACCIDENTAL RELEASE MEASURES' under section 6.
 Should be disposed properly in accordance with local regulations.
 This smoke tubes does not contain any hazardous components. Should be disposed properly in accordance with local regulations.
 When the smoke tube is soaked in water, water is acidic. Should be disposed properly in accordance with local regulations. Alternatively, neutralize with sodium bicarbonate (baking soda) in a well-ventilated place or local exhaust ventilation before disposal. (For example, use 1L of 5w/v% sodium bicarbonate aqueous solution for six unused tubes.) Use caution because carbon dioxide and other substances may be generated during the neutralization process.

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE

MIXTURE (a porous material (<5%) in which stannic chloride(IV) (5-15%) is adsorbed is sealed in a glass tube)
 The product reacts with moisture in the air to generate hydrogen chloride and stannic oxide (IV).

There is component information of the product and smoke in terms of the performance of the products.

	Reagents		Smoke	
Chemical identity	Vermiculite	Stannic chloride (IV)	Hydrogen chloride	Stannic oxide (IV)
Synonyms	—	Tin tetrachloride	Anhydrous hydrochloric acid	Tin dioxide
Chemical formula	(Mg, Fe) ₃ (Si, Al, Fe) ₄ O ₁₀ (OH) ₂ ·4H ₂ O	SnCl ₄	HCl	SnO ₂
CAS RN	1318-00-9	7646-78-8	7647-01-0	18282-10-5
ISHL No.	—	(1)-260	(1)-215	(1)-551
Impure elements contributing to	No data available	No data available	No data available	No data available

classification and stabilizing additives

Content	< 5%	5-15%	maximum concentration: 1550ppm (40°C 1atm) (theoretical value)	—
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4. FIRST-AID MEASURES

Inhalation	If inhaled a large amount of smoke, remove victim to fresh air and keep at rest in a position comfortable for breathing. Contact a doctor immediately.
Skin contact	If the reagents or smoke comes in contact with the skin, immediately remove all affected clothes, rinse skin with water, and wash in shower. Contact a doctor immediately. Wash contaminated clothing before reuse.
Eye contact	If reagents or smoke enters the eyes, immediately flush with plenty of water for at least 15 minutes and consult a doctor immediately. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Contact a doctor immediately.
Ingestion	If reagents is swallowed, rinse the mouth immediately and contact a doctor.
Most important symptoms/effects, acute and delayed	Inhalation: Corrosive. Burning sensation. Cough. Labored breathing. Shortness of breath. Sore throat. Symptoms may be delayed. Skin contact: Severe skin burn, pain. Eye contact: Corrosive. Pain, blurred vision, and severe burns. Symptoms of pulmonary oedema often do not appear until 2-3 hours have elapsed and are exacerbated without rest. Rest and medical observation are therefore essential.
Personal protective equipment (PPE) for first-aid responders	The rescuer should wear appropriate personal protective equipment, as appropriate.
Special precautions for doctors	A doctor or person appointed by a doctor should consider implementing appropriate respiratory treatment promptly.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media	Water spray, foam extinguishing agents, powder extinguishing agents, carbon dioxide, dry sands.
Unsuitable extinguishing media	Rod-like water discharge
Specific hazards arising from the chemical	Immediately remove the tube to the safe place. If it is impossible to move, cool by sprinkling water on the tube and the surrounding area. When water enters the inside of the tube, hydrogen chloride is generated, so be careful. Stannic chloride (IV) may generate irritating, corrosive and/or toxic gases by fire. The vapour is heavier than air Stannic chloride (IV) reacts violently with water and moisture and may form corrosive hydrochloric acid. Reacts with telepin oils, alcohols and amines causing fire and explosion hazard. Move smoke tubes from the fire area if not hazardous. Even after extinguishing the fire, sufficiently cool the smoke tubes using a large amount of water. When heated and decomposed, harmful hydrogen chloride is generated.
Special protective actions for fire-fighters	Equip appropriate respiratory apparatus, and wear protective (chemical-resistant) clothing.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	When the tube is broken, it fumes due to moisture in the air and generates harmful hydrogen chloride. Therefore, workers wear appropriate protective equipment (see section "8. Exposure Prevention and Protective Measures") and avoid contact with eyes and skin or inhalation of gases. Immediately isolate the appropriate distance in all directions as a leak zone. Do not touch or walk through leaks. Ban any unauthorized people from entry. Stay upwind. Avoid staying in low ground. Forbid entry to area until gas disperses. If in an enclosed space, ventilate. Do not release it into the environment.
Environmental precautions	The reagents is collected in a container, neutralized with sodium bicarbonate (baking soda) in a well-ventilated place or local exhaust ventilation, and then discarded. (For example, use 1L of 5w/v% sodium bicarbonate aqueous solution for six unused tubes.)
Collection/Neutralization	The reagents is collected in a container, neutralized with sodium bicarbonate (baking soda) in a well-ventilated place or local exhaust ventilation, and then discarded. (For example, use 1L of 5w/v% sodium bicarbonate aqueous solution for six unused tubes.)
Containment and purification methods/equipment	The reagents is collected in a container, neutralized with sodium bicarbonate (baking soda) in a well-ventilated place or local exhaust ventilation, and then discarded. (For example, use 1L of 5w/v% sodium bicarbonate aqueous solution for six unused tubes.)

Prevent Reoccurrence of accidents

Remove all ignitors. (Ban smoking in the vicinity, as well as anything that sparks or emits flame.) Prevent leaks into drainage pipes, sewers, basements, and other sealed areas. Stay away from affected area until gas has dispersed.

7. HANDLING AND STORAGE

Handling

- Technical measures** Employ 'EXPOSURE CONTROL/ PERSONAL PROTECTION' under section 8 and equip protective gear.
- Precautions for safe handling** Do not inhale smoke because the tube fumes due to reaction with moisture in the air and generates harmful hydrogen chloride. Smoke contains harmful hydrogen chloride and irritates the eyes and the skin. When inhaled, it irritates the mucous membranes of the nose, throat, etc., and the coughing is produced.
Do not use the tube in the vicinity of precision equipment or electronic equipment as smoke corrodes metal.
Do not generate smoke toward humans.
Do not use in sealed spaces. Nebulization should be performed thoroughly during use.
When breaking off both ends of the tube, wear appropriate protective equipment to prevent injury.
Do not touch the reagents with bare hands when the tube cuts, spatulas, or breaks.
Do not intentionally inhale.
Do not eat, drink, or smoke when using this product. Wash hands thoroughly after handling.
Do not inhale the gas. Avoid contact with skin. Avoid contact with eyes.
- Avoiding Contact** See Section 10, 'Safety and Reactiveness.'

Storage

- Contamination Dangers** See Section 10, 'Safety and Reactiveness.'
- Storage Requirements** The tubes should be stored in a cool and dark place. The attached cap is for temporary storage and should not be used for long-term storage. Do not store with rubber balls attached.
Do not store with precision instruments or electronic products.
Store away from combustible substances, strong reducing agents, strong oxidants, strong bases, metals.
Store in a cool, well-ventilated place protected from sunlight. Store in locked area.

8. EXPOSURE CONTROL/ PERSONAL PROTECTION

Control parameters

- Administrative levels(JAPAN)** Not Applicable
- JSOH(JAPAN)** Hydrogen chloride: 2ppm, 3.0mg/m³ (maximum permissible concentration) (2014)
- ACGIH** Hydrogen chloride: TLV-STEL(C) 2ppm(2009)
Stannic chloride (IV): TLV-TWA 2mg/m³ as Sn

Appropriate engineering controls The facility in which this product is stored and/or used should be equipped with an eye-washing apparatus and a safety shower.

Individual protection measures, such as personal protective equipment (PPE)

- Respiratory protection** Wear appropriate respiratory protective equipment. Wear an insufflation mask, air respirator, or oxygen respirator when exposure is possible.
- Eye /face protection** Wear appropriate protective eye protection.
- Skin protection** Wear protective clothing and protective gloves

9. PHYSICAL AND CHEMICAL PROPERTIES AND SAFETY CHARACTERISTICS

Reagents are prepared by adsorbing chemicals on porous materials, and there is no physical and chemical properties. Physical and chemical properties of chemicals contained in the reagents and generated gases for humans in single cases are described below.

	Reagents		Smoke
	Stannic chloride (IV)	Hydrogen chloride	Stannic oxide (IV)
Physical state	Liquid :ICSC(2004)	Gas (mist)	solid (20°C, 1atm) (GHS definition)
Colour	Colourless or slightly yellow: ICSC(2004)	White	White or slightly gray (ICSC (2004))
Order	Pungent odor : ICSC(2004)	Pungent odor	No data available
Melting point/freezing point	-33°C : HSDB (2014)	-114.31°C : ACGIH (7th, 2002)	1,630°C (HSDB(Access on August 2019))
Boiling point, initial boiling point and boiling range	114.15°C:HSDB (2014)	-85.05 (760mmHg) : Merk (13th, 2001)	1,800~1,900°C (sublimation point) (ICSC (2004))

Flammability	Non flammable : ICSC (Access on Dec. 2008)	No data available	Non flammable (ICSC (2004))
Lower and upper explosion limit /flammability limit	No data available	No data available	No data available
Flash point	Non flammable:HSDB (2014)	Non flammable gas :Hommel (1991)	No data available
Auto-ignition temperature	No data available	Non flammable gas :Hommel (1991)	No data available
Decomposition temperature	No data available	No data available	No data available
pH	0.2(20°C) :HSDB (2014)	0.10 (1.0 N); 1.10 (0.1 N); 2.02 (0.01N); 3.02 (0.001 N); 4.01 (0.0001 N) : HSDB (2005)	4~5 (20°C) (GESTIS (Access on August 2019))
Kinematic viscosity	No data available	No data available	No data available
Solubility	Soluble in water : HSDB (2004)	Water: 67g/100ml(30 °C)(ICSC (2002)) 82.3g/100g (0 °C)(Merk (13th, 2001))	Water:insoluble (ICSC (2004))
Partition coefficient n-octanol/water (log value)	No data available	logPow=0.25 : ICSC (2002)	No data available
Vapour pressure	18mmHg (20 °C) : NITE (Access on Oct. 2009)	80.6bar(50°C) [= 8059999Pa(50°C)] : GESTIS (2004)	No data available
Density and/ or relative density	2.34g/cm3 : NITE (Access on Oct. 2008)	1.491 mg/cm3 (25°C, 1013 hPa) : SIDS (2002)	6.95 g/cm3 (ICSC (2004))
Relative vapour density	9 (Air=1) : NITE (Access on Oct. 2008)	1.268; 1.05 (15°C) (air=1.0) : ACGIH (7th, 2002)	No data available
Particle characteristics	No data available	No data available	No data available

10. STABILITY AND REACTIVITY

Reactivity	The tube reacts with moisture in the air to generate hydrogen chloride and stannic oxide(IV).
Chemical Stability	Consider storage and handling in accordance with the instructions to be stable.
Possibility of hazardous reactions	Stannic chloride (IV) in reagents reacts violently with water and moisture to form corrosive hydrochloric acid. Reacts with telepin oils, alcohols and amines causing fire and explosion hazard. Attacks many metals, certain plastics, rubbers and coatings. Stannic oxide (IV) in smoke reacts violently with strong reducing agents. Hydrogen chloride in smoke is heavier than air and reacts violently with oxidants to produce toxic gases (chlorine). An aqueous solution of hydrogen chloride is a strong acid, it reacts violently with bases and is corrosive. Hydrogen chloride, in the presence of water, attacks many metals and produces flammable gases (hydrogen).
Conditions to Avoid	Moisture, contact with metals
Incompatible materials	Reagents: telepin oils, alcohols and amines Smoke: flammable substances, strong reducing agents, oxidants, bases, metals and water
Hazardous decomposition products	Hydrogen chloride in smoke may generate chlorine and hydrogen when decomposed.

11. TOXICOLOGICAL INFORMATION

Reagents are prepared by adsorbing chemicals on porous materials, and there is no toxicological information. Toxicological information of chemicals contained in the reagents and generated gases for humans in single cases are described below.

Acute Toxicity

Oral	Reagents; Stannic chloride (IV): No data available Smoke; Hydrogen chloride: Based on LD50 values of 238 - 277 mg/kg and 700 mg/kg for rats (SIDS (2009)), the lower value was adopted and the substance was classified into Category 3. Stannic oxide (IV) : Based on LD50 values of >2,000 mg/kg for rats (REACH (Access on August 2019)) , the substance was classified as "Not classified".
Skin	Reagents; Stannic chloride (IV): No data available Smoke; Hydrogen chloride: Based on a LD50 value of >5010 mg/kg for rabbits (SIDS (2009)), the substance was classified as "Not classified". Stannic oxide (IV) : No data available

Reagents;
Stannic chloride (IV): Liquid (GHS definition)
Smoke;

Inhalation Hydrogen chloride: Based on LC50 values of 4.2, 4.7 and 283 mg/L (4-hour equivalence: 1411, 1579 and 95,083 ppm, respectively) for rats (SIDS (2009)), the lowest value was adopted and the substance was classified into Category 3.

Stannic oxide (IV) : Solid (GHS definition)

Reagents;

Stannic chloride (IV): Based on the report of an LC50 value (4 hours) of 1.35 mg/L (=131 ppm) for rats for the vapor of this substance (vehicle: air with relative humidity >= 50%) (SIDS (2009)), it was classified in Category 2. Besides, since the LC50 value is lower than 90% of the saturated vapor concentration (23,692 ppm), the reference value in units of ppm was applied as a vapor without a mist. Moreover, in this report, there is a description (Test

Vapor substance vapor formed a white cloud in contact with the humidified air) indicating that hydrogen chloride is generated by the reaction of this substance with moisture in the air as the vehicle. Based on this high-priority new information source (SIDS (2009)), the category was revised.

Smoke;

Hydrogen chloride: No data available

Stannic oxide (IV) : No data available

Reagents;

Stannic chloride (IV): No data available

Smoke;

mist Hydrogen chloride: Based on a LC50 value (aerosol) of 1.68 mg/L/1h (4-hour equivalence: 0.42 mg/L) for rats (SIDS (2009)), the substance was classified into Category 2.

Stannic oxide (IV) : Based on a LC50 value (aerosol) of >2.04 mg/L/4h for rats (REACH (Access on August 2019)) , the substance was classified as "Not classified".

Skin corrosion/irritation

Reagents;

Stannic chloride(IV): There is a report that in a skin irritation test in which this substance was applied to rabbits for 1 or 4 hours (OECD TG 404), it showed corrosion (primary irritation score is unknown) (SIDS (2009)). In addition, there is a report that in a skin irritation test with rats, it is irritating to the skin at or above the concentration of 5% of this substance (SIDS (2009)). From the above results, it was classified in Category 1. Besides, this substance is classified as "C; R34" in EU DSD, and as "Skin Corr. 1B H314" in EU CLP.

Smoke;

Hydrogen chloride: In a rabbit skin irritation test, application for 1 - 4-hour caused corrosion at higher concentrations (SIDS (2009)). Skin irritation and ulceration with fur discoloration occurred in mice and rats dermally exposed for 5 - 30 minutes (SIDS (2009)). In human experiments, there are reports that contact caused slight to strong irritation, or ulceration and severe burns to the skin (SIDS (2009)). Based on these data, the substance was considered to have corrosive properties, and was classified into Category 1.

Stannic oxide (IV) : No data available

Serious eye damage/irritation

Reagents;

Stannic chloride (IV): In an eye irritation test in which 0.1 mL of undiluted liquid of this substance was applied to rabbit eyes (washed or non-washed after 20 seconds), moderate to severe corneal opacity, moderate iris hyperemia and moderate conjunctival redness were observed in the washed group. Severe corneal opacity and extreme conjunctival whiteness were observed in the non-washed group (SIDS (2009)). In addition, eye closure was observed until 14 days later in the washed and the non-washed eye groups. From the above results, it was classified in Category 1.

Smoke;

Hydrogen chloride: The substance was classified as a skin corrosive substance. In eye damage and irritation tests, solutions of the substance, hydrochloric acid, was used as a test substance. In animal tests including rabbit tests, high irritation, damage and corrosion to eyes have been reported (SIDS (2002)). For humans, the concentrated solution can cause permanent damage and loss of sight (SIDS (2002)). Based on these data, the substance was classified into Category 1. As relevant information, in EU classification, the substance is classified into C; R34.

Stannic oxide (IV) : In an eye irritation test using rabbits conforming to OECD TG 405, slight conjunctival redness and edema were observed 1hour after application, but disappeared after 24 hours (REACH (Access on August 2019)) , so the substance was classified as "Not classified".

Respiratory or skin sensitization

Respiratory Sensitization:

Reagents;

Stannic chloride (IV): No data available

Smoke;

Hydrogen chloride: Since the substance is on the sensitizing chemical substance list by Japanese Society of Occupational and Environmental allergy, the substance was classified into Category 1. There is a report that after exposure to a cleaning product that contained hydrogen chloride, the subject developed bronchospasm and still had marked asthma symptoms 1 year after exposure that were triggered by exercise and inhalation of trivial concentrations of irritants (ACGIH (2003)).

Stannic oxide (IV) : No data available

	Skin Sensitization: Reagents; Stannic chloride (IV): Classification not possible due to lack of data. Besides, there is a report that in a sensitization test in which this substance was applied to rats, no sensitization was observed (SIDS (2009)). However, since it is not a test method according to the guidelines and the details of the results and others are unknown, the data were judged insufficient for use in classification. Smoke; Hydrogen chloride: A guinea pig maximization test and a mouse ear swelling test demonstrated negative results (SIDS (2009)) for the substance. In a human test using fifty volunteers, none gave a positive reaction in a challenge application, 10 – 14 days after the final induction application (SIDS (2009)). The substance was classified as "Not classified". Stannic oxide (IV) : SI values in the mouse local lymph node assay that conforms to OECD TG 429 (LLNA) is not calculated, it is judged as negative (REACH (Access on August 2019)) ,so the substance was classified as "Not classified".
Germ cell mutagenicity	Reagents; Stannic chloride (IV): Classification not possible due to lack of data. There are no in vivo data. As for in vitro, it was negative in a bacterial reverse mutation test and positive in a chromosome aberration test, a micronucleus test and a sister chromatid exchange test with cultured mammalian cells (SIDS (2009), ATSDR (2005), CICAD 65 (2005)). Smoke; Hydrogen chloride: Classification not possible due to lack of data from in vivo mutagenicity tests. From in vitro mutagenicity tests, there is a report of a negative Ames test and a positive result (which is considered to be an artifact due to the low pH) chromosome aberration test (SIDS (2009)).
Carcinogenicity	Stannic oxide (IV) : No data available Reagents; Stannic chloride (IV): No data available Smoke; Hydrogen chloride: Based on the classifications of "Group 3" in IARC (1992) and "A4" in ACGIH (2003), the substance was classified as "Not classified". As relevant information, no evidence of carcinogenicity was observed in rat and mouse carcinogenicity tests (SIDS (2009)). Epidemiologic tests did not suggest an association between exposure to hydrogen chloride and cancer development (IARC 54 (1992), PATTY (5th, 2001)).
Reproductive toxicity	Stannic oxide (IV) : No data available Reagents; Stannic chloride (IV): No data available Smoke; Hydrogen chloride: In rat and mice tests by exposure during gestation period, there were no adverse effects on fetal development, however, classification was not possible since there are no data for effects on sexual function and fertility by exposure before mating or gestation.
STOT-single exposure	Stannic oxide (IV) : No data available Reagents; Stannic chloride (IV): Inorganic tin compounds are irritating to the mucosa (ATSDR (2005), HSDB (Access on July 2014)). There is a report of labored respiration, gasping, nasal and oral discharge, reduced response to noise and wet fur at 0.29-3.08 mg/L vapor by inhalation exposure to rats (SIDS (2009)). Since this substance was judged irritating to the respiratory tract from the above, it was classified in Category 3 (respiratory tract irritation). Smoke; Hydrogen chloride: In humans, inhalation exposure caused symptoms such as dyspnea, laryngitis, bronchitis, bronchoconstriction, pneumonia and edema. Inflammation and necrosis of the upper respiratory tract and pulmonary edema have also been reported (DFGOT vol. 6 (1994), PATTY (5th, 2001), IARC 54 (1992), ACGIH (2003)). In animal tests, toxic effects with morphological change of the lung and bronchus such as bronchitis with mucosal necrosis, pulmonary edema, hemorrhage, and thrombus were observed at dose levels within the guidance value range for Category 1 (ACGIH (2003), SIDS (2009)). Based on the information for humans and animals, the substance was classified into Category 1 (respiratory system).
STOT-repeated exposure	Stannic oxide (IV) : No data available Reagents; Stannic chloride (IV): In an epidemiological survey of 267 workers in a glass bottle manufacturing plant, respiratory symptoms such as wheezing, cough, chest pain and dyspnea occurred in workers exposed to fumes of this substance, the reason of which was considered to be the respiratory tract irritation by exposure to hydrogen chloride formed in the process of mixing this substance with water on heating (SIDS (2009), CICAD 65 (2005)). Therefore, since respiratory tract symptoms were expected to occur by inhalation of hydrogen chloride derivatively formed by hydrolysis of this substance in the workplaces handling this substance, it was classified in Category 1 (respiratory organs). In addition, there are reports that stannic oxide (IV), which is formed simultaneously by hydrolysis, causes pneumoconiosis (stannosis) in humans (SIDS (2009), ATSDR (2005)), and this also corresponds to Category 1 (respiratory organs). On the other hand, in experimental animals, although there are no findings on exposure to this substance, histopathological changes in the nasal cavity were observed in rats and mice

that inhaled hydrogen chloride mist for 90 days (SIDS (2009)). Besides, as for stannous chloride (ID: 56; CAS RN: 7772-99-8), a related substance, it was considered that no respiratory tract effects occur in humans because it is unlikely to generate "hydrogen chloride or hydrochloric acid" or "stannous oxide (II)" by reaction with moisture in the air, unlike this substance. However, based on the findings on experimental animals through the oral route, the liver, kidney and hemal system were adopted as the target organs. On the other hand, there were no experimental animal data for this substance, so it was impossible to identify the target organs. Therefore, the classification results were different between the two substances (refer to the classification results of stannous chloride (ID: 56; CAS RN: 7772-99-8)).

Smoke;

Hydrogen chloride: There are 2 or more reports for humans in which repeated exposure caused tooth damage by erosion (SIDS (2002), EHC 21 (1982), DFGOT vol. 6 (1994), PATTY (5th, 2001)). Additionally, an increase in the frequency of chronic bronchitis was reported (DFGOT vol. 6 (1994)). Based on the information, the substance was classified into Category 1 (tooth, respiratory system).

Stannic oxide (IV) : Inhalation exposure to tin (oxide) dust and fume is known to cause tin pneumoconiosis (mild pneumoconiosis) (ACGIH (7th, 2019)). Therefore it was classified as Category 1 (lungs) because the effect on the lungs has been shown in humans.

Aspiration hazard

Reagents;

Stannic chloride (IV): No data available

Smoke;

Hydrogen chloride: Gas (GHS definition)

Stannic oxide (IV) : No data available

12. ECOLOGICAL INFORMATION

Toxicity

Reagents;

Stannic chloride (IV): This substance readily decomposes in water and produces hydrochloric acid, pH drop by which is thought to cause effects to aquatic organisms. Because it is described that crustacea (Daphnia magna) is one of the most sensitive species from the results of tests using hydrochloric acid (SIDS, 2002), and the minimum concentration of hydrolyzed SnCl₄ that would result in a similar pH/concentration of aqueous HCl, assuming complete hydrolysis, would be about 8.8 mg SnCl₄/L in an unbuffered solution (SIDS, 2007), it was classified in Category 2.

Smoke;

Hydrogen chloride: Classified into Category 1 from its 48h-EC₅₀ = 0.492 mg/L for Crustacea (Daphnia magna) (SIDS, 2005), etc.

Stannic oxide (IV) : No data available

Persistence and degradability

Reagents;

Stannic chloride (IV): Reliable chronic toxicity data were not obtained. It was classified in Category 2 in acute toxicity, but it is estimated to be largely due to a drop of pH by hydrochloric acid produced, and it was judged to be inappropriate to use the classification result in acute toxicity for classification in chronic toxicity. Therefore, it was classified as "Classification not possible."

Smoke;

Hydrogen chloride: 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 strongly acidic.

Stannic oxide (IV) : No data available

Bioaccumulative potential

No data available

Mobility in Soil

No data available

Hazard to the ozone layer

No data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

If unreacted reagents still remain in the glass tube, it reacts with moisture in the air to generate hydrogen chloride. Dispose of the tube after being immersed in a lot of water (e.g. 1L) or after all the reagents are consumed.

When the smoke tube is soaked in water, water is acidic. Should be disposed properly in accordance with local regulations.

Alternatively, neutralize with sodium bicarbonate (baking soda) in a well-ventilated place or local exhaust ventilation before disposal. (For example, use 1L of 5w/v% sodium bicarbonate aqueous solution for six unused tubes.) Use caution because carbon dioxide and other substances may be generated during the neutralization process.

This smoke tubes do not contain any hazardous components. Should be disposed properly in accordance with local regulations.

When the tube is broken, employ 'ACCIDENTAL RELEASE MEASURES' under section 6. Should be disposed properly in accordance with local regulations.

Pollution Containers and Wrappings

This smoke tubes do not contain any hazardous components. Should be disposed properly in accordance with local regulations.

14. TRANSPORT INFORMATION

Sea Fare Information	Follow IMO regulations.
IATA	Follow ICAO • IATA regulations.
UN No.	1827
Domestic Regulations	Follow Industrial Health and Safety Act regulations.
Special precautions for user	Breakage of tubes caused by drops, high pressure or bends should be avoided.

15. REGULATORY INFORMATION

Industrial Safety and Health Act	Notifiable Dangerous Substance (Article 57 – 2, enforcement order 18 – 2, appendix 9) (Cabinet Order Number: 9 – 98, 9-322) Specific Chemical Substance Class 3 Substance ; hydrogen chloride Risk assessment Substance (Article 57-3)
Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof	Not Applicable
Poisonous and Deleterious Substance Control Law	Not Applicable
Air Pollution Control Act	Specific Substance (Article 10-9 of Cabinet Order) ; hydrogen chloride
Water Pollution Prevent Act	Designated Substances (Article 3-3-5 of Cabinet Order) ; hydrogen chloride

16. OTHER INFORMATION

References	All references are included in context.
Other References	NITE chirp IATA dangerous Goods Regulation

This safety data sheet of the harmful chemical substance is provided to handlers of this product to ensure their safety. Please understand that this sheet is for reference only and all responsibility shall fall on the handlers, so it is imperative that proper setup and planning be implemented in order to ensure safety.

The information provided on this data sheet does not guarantee safety.