

Material Safety Data Sheet
Flame Retardant Compound “STOX-501”
Complex of antimony trioxide and natural minerals

SECTION1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier:	STOX-501(Complex of antimony trioxide and natural minerals)
1.2 Relevant identified uses of the substance or mixture and uses advised against:	Flame retardant additives for plastic etc. No uses advised against.
1.3 Details of the supplier of the safety data sheet	Manufacturer : Nihon Seiko Co., Ltd., Sales Department, 3-2 Shimomiyabi-cho Shinjuku-ku,Tokyo 162-0822, Japan Tel +81-3-3235-0031 Fax +81-3-3235-0034; E-mail mail@nihonseiko.co.jp.
1.4 Emergency telephone number	Quality Assurance Section, Nakase Refinery Tel +81-79-667-2121


SECTION2: HAZARDS IDENTIFICATION

(1)Antimony Trioxide

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008	Carcinogen class 2; H351: Suspected of causing cancer by inhalation
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2.2 Label elements according to Regulation (EC) No.1272/2008 (CLP/GHS)

Hazard pictogram	GHS08: health hazard 
Signal word	Warning
Hazard statements	H351: Suspected of causing cancer by inhalation.
Precautionary statements	P202:Do not handle until all safety precautions have been read and understood P281:Use personal protective equipment as required P308+P313:IF exposed or concerned: Get medical advice/attention P405:Store locked up For more information on human health and environmental effects see section 9 to 12 of this MSDS.
2.3 Other hazards	The substance does not meet the criteria for a PBT or vPvB substance. No environmental or physicochemical hazards identified.

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 **NIHONSEIKO CO., LTD.**

(2)Natural minerals	Not applicable for GHS classification.
(3)Stearic acid	Not applicable for GHS classification.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Name	(1)Antimony trioxide (2)Natural minerals (3)Stearic acid
CAS No	(1)1309-64-4 (3)57-11-4
EINECS No	(1)215-175-0 (3)200-313-4
Components and concentration	Sb ₂ O ₃ 45 - 55% SiO ₂ 28 - 34% Al ₂ O ₃ 7 - 11% Fe ₂ O ₃ 2 - 6% CaO 0.2 - 4% Stearic acid 2 - 4%
Hazardous impurities As and Pb	As; 0.03%, Pb; 0.03%

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice	Take off all contaminated clothing. First-aiders should wear suitable personal protective equipment (see section 8) in case of insufficient ventilation or possible skin or eye contact.
Following skin contact	If normal occupational hygiene measures are maintained, there is no such foreseeable health hazard from this product. Wash with water and remove clothes if necessary.
Following eye contact	If normal occupational hygiene measures are maintained, there is no such foreseeable health hazard from this product. Flush eyes thoroughly with water, also under eyelids.
Following inhalation	Move affected person to fresh air. Seek medical attention.
After ingestion	If normal occupational hygiene measures are maintained, there is no such foreseeable health hazard from this product. Rinse mouth with water. Do not induce vomiting

4.2 Most important symptoms and effects, both acute and delayed Acute or delayed effects are not anticipated for this product.

4.3 Indication of any immediate medical attention and special treatment needed Not required.

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SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

suitable Use fire fighting measures that suit the environment.
The product is not combustible and does not support the combustion.

Unsuitable None

5.2 Personal precautions, protective equipment and emergency procedures Antimony trioxide or mineral dust

5.3 Advice for firefighters Wear a self-contained breathing apparatus and a fully protective suit and gloves.
Dispose of fire debris and contaminated fire fighting media in accordance with official regulations.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures Avoid formation of dust.
Ensure adequate ventilation.
Keep unprotected persons away.
Although the substance has no acute toxicity, it is advised to avoid contact with skin, eyes, and clothing
– wear suitable protective equipment (see section 8).
Avoid inhalation of dust – wear suitable protective equipment (see section 8).

6.2 Environmental precautions Although the substance is not classified as dangerous to the environment, it is advised that in the event of an accidental release the product should be prevented from reaching the sewage system or any water course and penetrating the ground/soil.
Dispose of spilled material in accordance with the relevant regulations.
See section 13 for disposal considerations.

6.3 Methods and material for containment and cleaning up In any case avoid dust formation.
Sweep all spilled material or use an appropriate industrial vacuum cleaner.
Collect spilled material in suitable containers or closed plastic bags for recovery or disposal.
In case of disposal dispose spilled material or contaminated material as waste as described in section 13.

6.4 Reference to other sections For more information on exposure controls/personal protection or disposal considerations, check section 8 and 13 of this safety data sheet.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

7.1.1 Protective measures As a precautionary measure, the wearing of chemical resistant gloves, long sleeved overalls and closed footwear, designed to minimize skin contact is suggested for all (di)antimony trioxide powder handling workplaces.
Provide showers, eye-baths and self-contained breathing

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	apparatus nearby.
7.1.2 Advice on general occupational hygiene	<p>Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating, drinking and smoking at the workplace and wearing standard working clothes and shoes unless otherwise stated.</p> <p>Wash hands after use.</p> <p>Remove contaminated clothing and protective equipment before entering eating areas.</p> <p>Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.</p>
7.2 Conditions for safe storage, including any incompatibilities	<p>Store in well ventilated dry area.</p> <p>Do not store in open inadequate mislabeled packaging.</p>
SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION	
8.1 Control parameters	<p>(2) Mineral dust $E=3.0/(1.19Q+1)$ E: Control concentration, Q= Contents of disengaged silicic acid (%)</p>
US limit values	<p>(1)ACGIH (2009); 0.5mg/m³ (TLV-TWA, as antimony) (2)ACGIH (2006); 0.025mg/m³ (TLV-TWA, as crystal silica)</p>
Singapore limit value	(1)None
8.2 Exposure controls	
8.2.1 Appropriate engineering controls	<p>Prevent formation of dust where possible. Ensure appropriate ventilation/exhaustion at machinery and places where dust can be generated. Any deposit of dust which cannot be avoided must be regularly removed using preferably appropriate industrial vacuum cleaners or central vacuum systems.</p> <p>Waste air is to be released into the atmosphere only when it has passed through suitable dust separators.</p> <p>Waste water generated during the production process or cleaning operations should be collected and should preferably be treated in an on-site waste water treatment plant which ensures efficient removal of antimony.</p>
8.2.2 Individual protection measures, such as personal protective equipment	
8.2.2.1 Eye/face protection	<p>Although the substance has no acute toxicity, it is advised to wear suitable safety glasses.</p> <p>NBN EN 166:2002 is recommended.</p>
8.2.2.2 Skin protection	<p>Hand and body protection:</p> <p>(1)ATO is not classified as hazardous to skin (see section 11 for more details). However, industry is committed to adequately control the risks of any adverse effects to workers who are exposed in hot, sweaty conditions to fumes or dust containing ATO by following the occupational hygiene</p>

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practices as described in the relevant exposure scenarios. As a precautionary measure, the wearing of chemical resistant gloves, long sleeved overalls and closed footwear, designed to minimize skin contact is suggested for all (di)antimony trioxide powder handling workplaces because of possible skin rashes when sweat ducts are blocked – see RAC discussion (ECHA/PR/09/09, 2009).

8.2.2.3 Respiratory protection

Use local ventilation to keep levels below established threshold values.
A suitable particle filter mask is recommended.

8.2.2.4 Thermal hazards

Not applicable.
This product does not have any self-heating or auto-flammable properties.

8.2.3 Environmental exposure controls

Although the substance is not classified as dangerous to the environment, it is advised to avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Gray powder
Odour	Odourless
Odour threshold	(1)Not applicable as odourless
pH	(1)Not applicable
Melting point	(1)656°C at 1013hPa (3)69 – 70°C
Initial boiling point/range	(1)1,425°C at 1013hPa (3)383°C (decomposition)
Flash point	(1)(2)Not applicable (3)395°C
Evaporation rate	(1)Not applicable
Flammability (solid, gas)	(1)Non-flammable
Flamm. or expl. Limits	(1)Non explosive
Vapor pressure	(1)~33 Pa at 574°C
Vapor density	(1)Not applicable
Relative density	(1)5.897 at 20°C
Solubility	(1)2.76 mg/l (22.2 °C –ISO 6341 medium-loading 10mg Sb2O3/l-pH8) (2)(3)Insoluble

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Partion coeff. (K_{ow})	(1)Not applicable for inorganic substances
Auto-ignition temp	(1)Not applicable
Decomposition temp	(1)Not applicable
Viscosity	(1)Not applicable
Explosive properties	(1)Not applicable
Oxidizing properties	(1)Non-oxidizing substance
9.2 Other information	(1)Not applicable

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	Not applicable. Information on non applicability is given in section 9
10.2 Chemical Stability	Under normal conditions of use and storage, the product is stable.
10.3 Possibility of hazardous reactions	(1)Reaction with hydrogen releases toxic antimony hydride (stibine).Hazardous polymerization will not occur. (2) Avoid mixing with strong oxidizing agent such as fluorine, borontrifluoride, chlorine trifluoride, mangan fluoride or oxygen difluoride. (generate corrosive silicon fluoride gas)
10.4 Conditions to avoid	Avoid dust formation. See section 7.2 Conditions for safe storage, including any incompatibilities.
10.5 Incompatible materials	(1)Reaction with hydrogen releases antimony hydride (stibine). Strong acids and bases.
10.6 Hazardous decomposition products	Does not decompose if used as intended.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	(1)ATO has a low acute toxicity Oral LD ₅₀ rat ; >20,000 mg/kg bw (Myers et al, 1978) Dermal LD ₅₀ rabbit ; >8,300 mg/kg bw (Gross et al, 1955) Inhalation LD ₅₀ rat ; >5,000 mg/L (Leuschner, 2006) (3) LD ₅₀ (Vein, Rat) 22mg/kg
Skin corrosion/irritation	(1) ATO is not a skin irritant. However, under conditions of substantial heat and sweating, high levels of dermal dust exposure may cause mechanical/physical blocking of sweat glands in the absence of any intrinsic substantial primary skin irritating potential of the substance and also in consideration of the poor solubility of ATO. The Committee for Risk Assessment (RAC) decided in July 2009 that a harmonised skin irritation classification was not supported. (ECHA/PR/09/09, 2009) ATO is not irritating to eyes (Leuschner, 2005) or the

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	<p>respiratory system (Leuschner, 2006). ATO is not a corrosive agent.</p> <p>(2) May cause irritation by direct contact.</p> <p>(3) MOD 500mg/24 H (Rabbit)</p>
Skin sensitization	(1) Not skin sensitizing (Chevalier, 2005; Moore, GE, 1994)
Mutagenicity	<p>(1) ATO does not cause systemic mutagenicity in vivo after oral administration. Negative in vivo results on chromosome aberrations and micronuclei were obtained in two different species via oral application – mouse (Elliot et al., 1998) and rat (Whitwell, 2006), (Kirkland et al., 2007). An in vivo UDS assay in rats was also negative (Elliot et al., 1998). The classification criteria according to regulation (EC) 1272/2008 as germ cell mutagen are also not met.</p>
Carcinogenicity	<p>(1) Antimony trioxide is classified as inhalation carcinogen category 2 (according to regulation (EC) 1272/2008). Three chronic inhalation studies in rats are available for the carcinogenicity assessment of (di)antimony trioxide (Watt, 1983; Groth et al., 1986a, Newton et al., 1994). The exposure duration in all three animal studies is 12 months and thus all studies deviates from the OECD guideline on chronic toxicity/carcinogenicity, which prescribes an exposure period of 24 months for rats. The study by Newton et al., (1994) showed no (di)antimony trioxide-related lung tumours, neither in males nor females, at any dose level up to 4.5 mg/m³. The study shows that (di)antimony trioxide reduced the pulmonary clearance rate in a dose dependent manner. However, it is well known that reduced lung clearance rate at chronic exposure of rats to poorly soluble particles (PSPs) can result in pulmonary overload, subsequently followed by an inflammatory response, epithelial cell hypertrophy and/or hyperplasia and squamous metaplasia. The persistence of these tissue responses over chronic time periods can lead to secondary development of lung tumours (Hext, 1994).</p> <p>(2) Natural minerals are not recorded as carcinogen by IARC, NTP, OSHA but the component of crystal silica may cause cancer.</p>
Reproductive toxicity	<p>(1) Based on the available long-term toxicity studies in rodents (Omura et al, 2002) and the relevant information on the toxicokinetic behaviour in rats, it is concluded that (di)antimony trioxide does not present a reproductive toxicity hazard, because of the lack of absorption and systemic distribution, and a correspondingly negligible exposure of reproductive organs in male and female mammalian species to (di)antimony trioxide.</p> <p>For the reasons presented above, no classification for</p>

reproductive toxicity is required.
The reference Schroeder R.E. (2003) was identified as key study for developmental toxicity and will be used for classification and labelling. This study suggests that the NOAEC for developmental toxicity is > 6.3 mg antimony trioxide/m³. Thus, no classification as developmental toxicant according to regulation (EC) 1272/2008 is required.

STOT

(1)ATO is not classified as STOT, single exposure, oral and inhalation since no reversible or irreversible adverse health effects were observed immediately or delayed after exposure and no effects were observed at the guidance value.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Acute aquatic toxicity test results

Marine fish [<i>Pargus major</i>]	(1)96 h LC50= 6.9 mg Sb/L (Takayanagi, 2001)
Freshwater fish [<i>Pimephales promelas</i>]	(1)96 h LC50= 14.4 mg Sb/L (Brooke et al, 1986)
Invertebrates [<i>Chlorohydra viridissimus</i>]	(1)96 h LC50= 1.77 mg Sb/L (TAI, 1990)
Algae [<i>Pseudokirchneriella subcapitata</i>]	(1)72 h ErC50 (growth rate) > 36.6 mg Sb/L (Heijerick et al, 2004)
Plants [<i>Lemna minor</i>]	(1)4 d EC50 > 25.5 mg Sb/L (Brooke et al, 1986)

Chronic aquatic toxicity test results

Fish [<i>Pimephales promelas</i>]	(1)28 d NOEC/LOEC(growth; length) = 1.13/2.31 mg Sb/L (Kimball, 1978)
Invertebrates [<i>Daphnia magna</i>]	(1)21 d NOEC/LOEC(reproduction) = 1.74/3.13 mg Sb/L (Heijerick et al, 2003)
Algae [<i>Pseudokirchneriella subcapitata</i>]	(1)72 h NOEC/LOEC(growth rate) = 2.11/4.00 mg Sb/L (Heijerick et al, 2004)

Chronic sediment toxicity test results

Midge <i>Chironomus riparius</i>	(1)14-d NOEC (growth) = 78 mg Sb/kg ww (Heijerick et al, 2005)
Soil invertebrates	(1)NOEC = 999 mg Sb/kg dw (Moser, 2007)
Plants	(1)NOEC = 999 mg Sb/kg dw (Smolders et al., 2007)
Soil microorganisms	(1)NOEC = 2930 mg Sb/kg dw (Smolders et al., 2007)

Toxicity tests for microorganisms (for STP)

Aquatic microorganisms	(1)NOEC = 2.55 mg Sb/L (EPAS, 2005)
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Inhibition of nitrification

(1)EC50 = 27 mg Sb/L (EPAS, 2005)

12.2 Persistence and degradability

(1)Antimony cannot be degraded, but may be transformed between different phases, chemical species, and oxidation states. Antimony is therefore considered to be persistent (P) and very persistent (vP) like any other metal.

12.3 Bioaccumulative potential

(1)Bioaccumulation of antimony by both aquatic and terrestrial organisms is low. A BCF of 40 has been determined for aquatic organisms and a BSAF of 1 for earthworms. Therefore, antimony is not considered bioaccumulative (B) or very bioaccumulative (vB) based on the definitive criteria.

12.4 Mobility in soil

(1)A log Kp of 2.07 has been determined for soil.

12.5 Results of PBT and vPvB assessment

(1)The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances, such as antimony and its inorganic compounds. However, the available data has been compared to the criteria:

See 12.2 for (P) and 12.3 for (B). For (T): Chronic NOEC values are available for fish, invertebrates and algae (see Section 12). Antimony and antimony compounds do not meet any of the Toxicity criteria based on carcinogenicity, mutagenicity or reprotoxicity and there is no evidence of other chronic concerns. Therefore, (di)antimony trioxide is not considered toxic (T) based on the definitive criteria. Antimony, and therefore antimony trioxide, is not PBT or vPvB.

12.6 Other adverse effects

(1)Antimony trioxide is not expected to contribute to ozone depletion, ozone formation, global warming or acidification.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility.

Disposal must be in accordance with current national and local regulations. Chemical residues generally count as special waste. General EU requirements are given in Directive 2008/98/EC.

SECTION 14: TRANSPORT INFORMATION

UN number

Not applicable

UN class

Not applicable

Proper shipping name

Not applicable

Packing group

Not applicable

RID/ADR

Not applicable

ADNR/ADN

Not applicable

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IATA/ICAO	Not applicable
IMO/IMDG	Not applicable

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EINECS (EU)	(1)conform
TSCA (USA)	(1)listed
ENCS (Japan)	(1)1-543
DSL(Canada)	(1)listed
AICS (Australia)	(1)listed
ECL(Korea)	(1)KE/09846
PICCS (Philippines)	(1)listed
IECSC(China)	(1)listed

15.2 Chemical safety assessment	(1)A chemical safety assessment has been carried out for the substance
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SECTION 16: OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

Abbreviations used: check www.antimony.be or on request via your supplier regarding antimony trioxide.
References: Full list of used references can be provided on further request via your supplier.

Revision:

Revision No.	Issue date	Comment
No.00	Jan. 4 2011	New issue.

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