Safety Data Sheet

Antimony Oxide MSDS No. 9680.12

Date of Preparation: 3/3/97 Revision: 8/3/15

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Antimony Oxide **Synonyms:** Antimony white, Antimony Trioxide

General Use: Fire retardant **Restrictions on use:** None

Manufacturer: Marshall Additive Technologies

Division of the R. J. Marshall Company

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Date Revised: 8/3/15

Prepared By: Stephanie Nichols

Section 2 - Hazards Identification

Classification of the chemical in accordance with paragraph (d) of 1910.1200: Hazardous Classification according to Regulation (EC) No. 1272/2008 (CLP): Carcinogen Category 2

Classification according to Directive 67/548/EEC: Harmful; Xn; Carcinogen Category 3; R40: Limited evidence of a

carcinogenic effect.

Signal word: Warning



Pictogram:

Hazard Statement:

Suspected of causing cancer by inhalation.

Precautionary Statements:

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Wear protective gloves/protective clothing/eye protection/face protection.

IF exposed or concerned: Get medical advice/attention.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazards not otherwise classified: This substance does not meet the criteria for a PBT or vPvB substance. No environmental or physic-chemical hazards have been identified.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% By wt
(di)antimony trioxide	1309-64-4	>98.0
lead monoxide	1317-36-8	<0.1%
(di)arsenic trioxide	1327-53-3	<0.1%

Section 4 - First Aid Measures

Description of necessary measures, subdivided according to the different routes of exposure:

General advice:

If exposed or concerned: Get medical advice/attention.

Take off all contaminated clothing.

First responders should wear suitable personal protective equipment in case of insufficient ventilation or possible skin or eye

Inhalation: If overcome by high dust concentrations, remove to a ventilated area. Seek medical attention for any symptoms that may develop.

Eye Contact: Flush eyes thoroughly with water taking care to rinse under eyelids.

HMIS H 2 F 0

R 0 **PPE**† E

†Sec. 8

Skin Contact: Wash skin thoroughly with soap and water.

Ingestion: Rinse mouth with water.

Most important symptoms and effects, both acute and delayed: None anticipated.

Indication of any immediate medical attention and special treatment needed: None anticipated.

Section 5 - Fire-Fighting Measures

Suitable Extinguishing Media: Use firefighting measures that suit the environment. The product is not combustible and does not support combustion.

Unsuitable Extinguishing Media: None.

Special hazards arising from the substance or mixture: (Di)antimony trioxide dust.

Advice for fire fighters: Wear a self-contained breathing apparatus (SCBA) 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

Personal precautions, protective equipment, and emergency procedures:

Avoid formation and inhalation 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 PPE. Avoid inhalation of dust-wear suitable protective equipment.

Methods and materials for containment and cleaning up: Avoid dust formation. Sweep up all spilled material or use an appropriate industrial vacuum cleaner. Collect spilled material in suitable containers or closed plastic bags for recovery or disposal.

Section 7 - Handling and Storage

Precautions for safe handling:

Protective measures: Do not handle until all safety precautions have been read and understood. As a precautionary measure, the wearing of chemical resistant gloves, long sleeved overalls, and closed footwear designed to minimize skin contact is suggested. Use PPE as required. Provide showers, eye-baths and self-contained breathing apparatus nearby.

Advice on general occupation hygiene: 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, or smoking at the workplace and wearing standard working clothes and shoes unless otherwise stated. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home. Do not blow dust off with compressed air.

Conditions for safe storage, including any incompatibilities: Store in well-ventilated dry area. Do not store in open inadequate mislabeled packaging.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls:

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls:

Prevent formation of dust where possible. Any deposit of dust which cannot be avoided must be regularly removed using preferably appropriate industrial vacuum cleaners or central vacuum systems.

Waste air is to be released into the atmosphere only when it has passed through suitable dust separators.

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.

Respiratory Protection: Use NIOSH/MSHA approved dust respirator.

Protective Clothing/Equipment:

Gloves: Any dust-tight material (e.g. rubber-dipped cotton/rubber/nitrile/leather) suitable for the type of work could be used as material for gloves protecting against ATO exposure (non-corrosive inorganic substance). Breakthrough times are not relevant because corrosion and diffusion are excluded by the nature of the substance. Change gloves when damaged or according to manufacturer's instructions.

Other: Long-sleeves, closed footwear, and safety glasses are recommended.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Ingredient	OSHA PEL		ACGIH TLV	
	TWA	STEL	TWA	STEL
Antimony Oxide	$0.5 \text{ mg/m}^3 \text{ Sb}$	None established	$0.5 \text{ mg/m}^3 \text{ Sb}$	None established
Lead Monoxide	None established	None established	$0.05 \text{ mg/m}^3 \text{ Pb}$	None established
Arsenic Trioxide	10 ug/m ³ As	None established	$0.01 \text{ mg/m}^3 \text{ As}$	None established

Section 9 - Physical and Chemical Properties

Appearance: Crystalline white powder

Odor: odorless

Odor threshold: Odorless **pH:** not applicable to powders

Melting point/freezing point: 1213°F (656°C) @ 1013

hPa

Initial boiling point and range: 2597°F (1425°C) @

1013 hPa

Flash point: not applicable to powders **Evaporation rate:** not applicable to powders

Flammability: Non-flammable

Upper/lower flammability or explosive limits: non-

explosive

Vapor pressure: ~133 Pa at 1065°F (574°C) **Vapor density:** not applicable to powders **Relative density:** 5.897 @ 68°F (20°C)

Solubility: 2.76 mg/l (T° 22.2°C-ISO 6341 medium –

loading 100 mg Sb₂O₃/l-pH8)

Partition coefficient n-octanol/water: not applicable to

inorganic substances

Auto-ignition Temperature: Not applicable. **Decomposition Temperature:** does not decompose

Viscosity: not applicable

Section 10 - Stability and Reactivity

Reactivity: Not applicable.

Chemical Stability: Antimony oxide is stable at room temperature in closed containers under normal storage and handling

conditions.

Possibility of hazardous reactions: Reaction with H-equivalents releases antimony hydride (stibine, SbH₃). Hazardous

polymerization will not occur.

Conditions to Avoid: Avoid dust formation.

Incompatible materials: Strong acids, strong bases, reducing agents.

Hazardous Decomposition Products: Does not decompose if used as intended.

Section 11- Toxicological Information

Information on the likely routes of exposure:

Inhalation: Inhalation of vapors in high concentration may cause irritation.

Eye: May cause irritation through mechanical abrasion. **Skin:** May cause irritation through mechanical abrasion. **Ingestion:** May cause irritation to mucous membranes.

Toxicity Endpoints	Description of Effects	
Absorption	Oral = 0.05-0.3%	
	Dermal = 0.01-0.1% (negligible)	
	Inhalation = <1%	
Acute Toxicity	Based on the available data, the classification criteria for acute toxicity are not met. Oral: LD ₅₀ rat >20,000 mg/kg bw (Fleming, 1938; Gross et al, 1955; Weil et al, 1978) Dermal: LD ₅₀ rabbit > 8300 mg/kg bw (Gross et al, 1955) Inhalation: LC ₅₀ rat > 5200 mg/m ³ (Leuschner, 2006)	
Skin Corrosion/Irritation	Based on available data, the classification criteria as skin irritant are not met. 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 harmonized skin irritation classification was not supported (ECHA/PR/09/09, 2009). ATO is not a corrosive agent.	
Serious eye damage/irritation	Based on available data, the classification criteria for eye irritation are not met (Leuschner, 2005).	
Respiratory or skin	Based on available data, the classification for skin sensitization (Chevalier, 2005; Moore,	
sensitization	G.E, 1994) and for irritation to the respiratory system (Leuschner, 2006) are not met.	
Germ Cell Mutagenicity	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). Based on available data, the classification criteria according to regulation (EC) 1272/2008 as germ cell mutagen are not met.	
Reproductive Toxicity	Based on the available long-term toxicity studies in rodent (Omura et al, 2002) and the relevant information on the toxicokinetic behavior in rats, it is concluded that the classification criteria for reproductive toxicity are not met because of the lack of absorption and systemic distribution, and a correspondingly negligible exposure of reproductive organs in male and female mammalian species to ATO. 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 ATO/m³. Thus, based on available data, the classification criteria as developmental toxicant according to regulation (EC) 1272/2008 are not met.	
STOT-single exposure	Based on available data, the classification criteria as STOT-single exposure, oral and inhalation are not met since no reversible or irreversible adverse health effects were observed immediately or delayed after exposure.	

Section 11-Toxicological Information continued

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Toxicity Endpoints	Description of Effects	
STOT-repeated exposure	$NOAEC_{inhalation} = 0.51 \text{ mg/m}^3 \text{ (Newton et al, 1994)}$	
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Section 12 - Ecological Information				
Acute aquatic toxicity test results:				
Marine fish (Pagrus major)	96 hr LC ₅₀	6.9 mg Sb/L (Takayanagi, 2001)		
Freshwater fish (Pimephales promelas)	96 hr LC ₅₀	14.4 mg Sb/L (Brooke et al, 1986)		
Invertebrates (Chlorohydra viridissimus)	96 hr LC ₅₀	1.77 mg SB/L (TAI, 1990)		
Algae (Pseudokirchneriella subcapitata)	72 hr ErC ₅₀ (growth rate)	>36.6 mg Sb/L (Heijerick et al, 2004)		
Plants (Lemna minor)	4 d EC ₅₀	>25.5 mg Sb/L (Brooke et al, 1986)		
Chronic aquatic toxicity test results:				
Freshwater fish (Pimephales promelas)	28 d NOEC/LOEC (growth; length)	1.13/2.31 mg Sb/L (Kimball, 1978)		
Invertebrates (Daphnia magna)	21 d NOEC/LOEC (reproduction)	1.74/3.13 mg Sb/L (Heijerick et al, 2003)		
Algae (Pseudokirchneriella subcapitata)	72 h NOEC/LOEC (growth rate)	2.11/4.00 mg Sb/L (Heijerick et al, 2004)		
Chronic sediment toxicity test results:				
Midge (Chironomus riparius)	14 d NOEC (growth)	78 mg Sb/kg ww (Heijerick et al, 2005)		
Chronic terrestrial toxicity test results (values were determined in a soil spiked with Sb ₂ O ₃ and aged for 31 weeks before testing):				
Soil invertebrates	NOEC	999 mg Sb/kg dw (Moser, 2007)		
Plants	NOEC	999 mg Sb/kg dw (Smolders et al., 2007)		
Soil microorganisms	NOEC	2930 mg Sb/kg dw (Smolders et al., 2007)		
Toxicity tests for microorganisms (for STP)				
Aquatic microorganisms	NOEC	2.55 mg Sb/L (EPAS, 2005)		
Inhibition of nitrification	EC ₅₀	27 mg Sb/L (EPAS, 2005)		

Persistence and degradability: Whereas antimony formally meets the criterion for persistence based on the absence of any degradation, this criterion is considered not to be applicable to inorganic elements. In addition, under conditions of a standard EUSES lake and the median partition coefficient for suspended matter, antimony meets the criteria for rapid removal from the water column.

Bioaccumulative potential: Antimony does not meet the criteria for bioaccumulation: a BCF for aquatic organisms of 40 and a BSAF of 1 for earthworms are derived, and are all much lower than the threshold of 2,000 l/kg. Also, there is evidence to support that antimony does not biomagnify in the food chain. Therefore, antimony is not considered bioaccumulative (B) or very bioaccumulative (vB) based on the definitive criteria.

Mobility in soil: A log Kp of 2.07 has been determined for soil.

Results of PBT and vPvB assessment: 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 have been compared to the criteria: Antimony trioxide does not meet the criteria for PBT and vPvB. For (T): Chronic NOEC values are available for fish, invertebrates, and algae. The lowest NOEC is 1.13 mg Sb/L for fish (Kimball, 1978). Antimony and antimony compounds do not meet any of the oxicity criteria based on carcinogenicity, mutagenicity, or reprotoxicity (See Section 11) and there is no evidence of other chronic concerns. Therefore, antimony is not considered toxic (T) based on the definitive criteria.

Antimony, and therefore (di)antimony trioxide is not PBT or vPvB.

Other adverse effects: (Di)antimony trioxide is not expected to contribute to ozone depletion, ozone formation, global warming or acidification.

Section 13 - Disposal Considerations

Waste treatment methods: Whatever cannot be save for recovery or recycling should be managed in an appropriate and approved waste disposal facility. If the percentage of ATO in waste is greater than 1%, then the waste must be treated as hazardous under Directive 91/689/EEC. If the concentration is below 1%, then ATO-containing waste shall be handled as non-hazardous waste. All waste should be removed by licensed waste removal company, incinerated, or recycled. If only the total antimony concentration is waste is known then waste with greater than 1% antimony should be treated as hazardous under Directive 91/689/EEC. Processing, use, or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state, and local requirements. The used packaging is only meant for packing this product. After usage, empty the packaging completely.

Suitable disposal of hazardous waste for manufacturing and industrial use: Keep separate and dispose of to either
-Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the
incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006.
-Hazardous landfill operated under Directive 1999/31/EC.

Suitable disposal of non-hazardous waste for manufacturing and industrial use: Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference document on the Best Available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002).

Suitable disposal of waste for professional use: Waste from end-of-life articles can be disposed of as municipal waste, except when they are separately regulated, like electronic devices, batteries, vehicles, etc. Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference Document on the Best Available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002).

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

(Di)antimony trioxide which does not contain more than 0.5% arsenic is considered not dangerous and does not need to be classified for transportation.

IMO/IMDG: not restricted

UN Number: Not applicable

UN proper shipping name: Not applicable **Transport hazard class:** Not applicable

Packaging group: Not applicable

Environmental hazards: No environmental hazard

Special precautions for user: Not available

Transport in bulk according to Annex II or MARPOL72/78 and the IBC code: Not available

Harmonized Tariff Code for Antimony Oxide is 2825.80.0000

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number: Not listed (40 CFR 261.33)

RCRA Hazardous Waste Classification (40 CFR 261.??): Not classified

CERCLA Hazardous Substance (40 CFR 302.4) Antimony Trioxide =1000lbs final RQ; Arsenic = 1lb, Lead = 10lbs

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed

Antimony Oxide is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.0 (de minimis concentration = 1%)

Arsenic is subject to the reporting requirement of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR372.0. (de minimis concentration = 0.1%)

Antimony Oxide is subject to the reporting requirements of California's Safe Drinking Water and Toxic Enforcement ACT of 1986 ("Proposition 65").

CWA (Clean Water Act) Hazardous Substances (40 CFR116.4): Present; 1000lb RQ.

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not listed

TSCA

This substance is listed on the Chemical Substances Inventory of the Toxic Substance Control Act (TSCA Inventory [USA]).

Please note that this product is not subject to any legal reporting requirements under these acts.

FDA-Indirect Food Additives: 21CFR175.105.

UNITED STATES REGULATIONS

California: 22CCR Presumed Hazardous Wastes List: Present

California: 8 CCR Section 339 Directors List of Hazardous Substances: Present

California: Air Toxics Hot Spots Act Chronic Reference Exposure Levels (RELs): 0.2 ug/m3 REL (inhalation).

California: Air Toxics Hot Spots Act-Emission Inventory Criteria & Guidelines: known or potential carcinogen: 9/90; ADOA 1.0 lbs/yr.

California: Toxic Air Contaminant List (AB 1807, AB2728): Category IIa.

Connecticut: Hazardous Air Pollutants- HLVs (30 min): 25 ug/m3 HLV (handling use and production as Sb);

HLVs (8hr): 5ug/m3 HLV (handling use and production as Sb).

Delaware: Pollutant Discharge Requirements: 1000lb RQ.

Massachusetts: Oil and Hazardous Material List: 50lb RQ.

Michigan: Polluting Materials List: 100lb TRQ.

Minnesota: Hazardous Substance List: Carcinogen (handling and use as Sb production).

New Jersey: Discharge Prevention List of Hazardous Substances: Present.

New York: Reporting of Releases Part 597-List of Hazardous Substances: 1000lb RQ (air); 100lb RQ (land/water).

Pennsylvania: RTK Environmental Hazard List: Present.

Rhode Island: Hazardous Substance List: Toxic.

Texas: Effect Screening Levels-Long Term: 0.5ug/m3 ESL. Effect Screening Levels-Short Term: 5ug/m3 ESL.

INTERNATIONAL REGULATIONS

Canada: Listed on the DSL.

Canada: WHMIS: Classification of Substances: D2A. Ingredient Disclosure List 1%.

European Community: This product is listed on EINECS, the European Inventory of Existing Commercial Chemical Substances # 215-175-0.

EU Dangerous Substances Directive: Carc. Cat. 3; R-40, Labels Xn; R-40 Safety Phrases: S-2, S-22, S-36.

Australia: This product is listed on the List of Designated Hazardous Substances-Carc. Cat.3; R-40.

Australia: This product is listed on the Inventory of Chemical Substances (AICS).

Bahrain: This product is listed on the Restricted Chemicals List (production).

Belgium: This product is listed on the Limits on Substances and Preparations list.

China: This product is listed on the Chinese Inventory.

Denmark: This product is listed on the List of Undesirable Substances.

Germany Water Classification (VwVwS): Water Hazard Class-hazard Class1, hazard to waters.

Japan: This product is listed on the Existing and New Chemical Substances list-#1-543 and on the Deleterious Substances List. Italy: Listed as a Category 3 Carcinogen.

Korea: This product is listed on the Existing and Evaluated Chemical Substances List # KE-09846.

New Zealand: This product is listed on the HSNO Composite List of Single Component Substances Considered for Transfer.

Philippines: This product is listed on the Inventory of Chemicals and Chemical Substances (PICCS) List.

Switzerland: This product is listed on the Toxic Substances Classification List: Class 4.

Taiwan: Listed on NECI.

revision date 8/3/15 Antimony Oxide MSDS No. 968
United Kingdom: This product is listed on the Dangerous Substances CHIP Approved Supply List; Classification: Xn; R-40, Labels: Xn, Safety Phrases: S-2, S-22, S-36.

(Di)antimony trioxide is not a SEVESO substance, not an ozone depleting substance and not a persistent organic pollutant.

Section 16 - Other Information

Prepared By: Stephanie Nichols Revision Notes: updated throughout

Product Grades Available from the R. J. Marshall Company (this list may be incomplete):

C-TEC AO

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