Safety Data Sheet

C-TEC AOM **MSDS No. 9636.12**

Date of Preparation: 7/16/96 Revision: 1/10/18

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: C-TEC AOM, all grades
Synonyms: Ammonium Octamolybdate, tetraammonium hexamolybdate.
General Use: Flame retardant
Manufacturer: Marshall Additive Technologies
Division of The R. J. Marshall Company
26776 W. 12 Mile Road
Southfield, MI 48034-7807
Phone: (248) 353-4100, Fax: (248) 948-6460

Emergency Phone: (800) 424-9300
Date Revised: 1/10/18
Preparer: Stephanie Nichols

Section 2 - Hazards Identification

EC No. 1272/2008 (CLP): Not classified
Directive 67/548/EEC: Not classified

HMIS	
H	1
F	0
R	0
PPE†	E

†Sec. 8

Signal word: None
Symbol: None
Hazard Statements: None
Precautionary Statements: None
Other Hazards: The substance does not meet the criteria for a PBT or vPvB substance. No environmental, toxicological, or physico-chemical hazards have been identified.

Section 3 - Composition / Information on Ingredients

Ingredient Name	CAS Number	Percent by Weight
Ammonium Octamolybdate	12411-64-2	Max 100.0

Section 4 - First Aid Measures

Inhalation: If overcome by high dust concentrations, remove to a ventilated area.
Eye Contact: Flush eyes thoroughly taking care to rinse under eyelids. Do not scrub. Abrasion may cause irritation. If discomfort continues, continue to wash with water. If irritation persists, consult a physician.
Skin Contact: Wash skin thoroughly with soap and water. Consult a physician if irritation persists.
Ingestion: Consult a physician.
Most important symptoms and effects, both acute and delayed: None anticipated.
Indication of any immediate medical attention and special treatment needed: None expected to be required.

Section 5 - Fire-Fighting Measures

Suitable Extinguishing Media: Water spray, carbon dioxide, or other dry chemical.
Unsuitable Extinguishing Media: None
Specific Hazards: None known.
Hazardous Combustion Products: None known.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures: Avoid formation and inhalation of dust. Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs. Wear suitable protective equipment. Dispose of spilled material in accordance with local regulations.
Methods and materials for containment and cleaning up: Use an appropriate industrial vacuum cleaner, equipped with ULPA or HEPA filters. Collect spilled material in suitable containers or bags for recovery or disposal.

Section 7 - Handling and Storage

Precautions for safe handling: Avoid generating dust during handling. Store in a closed container in a dry area. Do not store in open, inadequate, or miss-labeled 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:

Respiratory Protection: Dust mask recommended.

Protective Clothing/Equipment: Wear protective gloves and glasses. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

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.

	OSHA PEL		ACGIH TLV	
Ingredient	**TWA**	**STEL**	**TWA**	**STEL**
Ammonium Octamolybdate	none estab.	none estab.	none estab.	none estab.

Section 9 - Physical and Chemical Properties

Physical State: powder
Appearance and Odor: white odorless
Odor Threshold: not applicable
pH: not applicable **Vapor Pressure:** n/e
Freezing/Melting Point: not applicable
Boiling Point: not applicable
Flash Point: not applicable
Flash Point Method: not applicable
Evaporation Rate: negligible at ambient temperatures
Flammability: Non-flammable.
Upper/lower flammability or explosive limits: not explosive

Vapor pressure: not applicable
Vapor Density (Air=1): not applicable
Relative Density: 3.47 @ 20C
Water Solubility: 1g/L @ 20°C
Other Solubilities: not applicable
Partition coefficient n-octanol/water: not applicable
Auto-ignition Temperature: Not applicable
Decomposition Temperature: Decomposes at about 200C.
Viscosity: not applicable
Specific Gravity (H_2O=1, at 4 °C): 3.18

Section 10 - Stability and Reactivity

Reactivity: Stable under ambient temperatures and pressures.

Chemical stability: This product is stable at room temperature in closed containers under normal storage and handling conditions.

Possibility of hazardous reactions: Molybdates react violently or explosively when reduced to molybdenum by heating with zirconium. Other hazardous reactions have not been identified

Conditions to avoid: None known.

Incompatible materials: Copper and copper-containing materials including bronze and brass.

Hazardous Decomposition Products: Upon thermal decomposition, gaseous ammonia (NH_3) evolves from tetraamonium hexamolybdate. Ammonia is classified as a hazardous substance according to EC No. 1272/2008 (CLP) as follows:

Index No. 007-001-00-5 “ammonia, anhydrous”, EC No. 231-635-3, CAS 7664-41-7
Flammable Gas 2, H221: Flammable Gas
Pressure. Gas, H331: Toxic if inhaled
Acute Tox 3, H331: Toxic if inhaled
Skin Corrosion 1B, H314: Causes severe burns and eye damage
Aquatic acute 1, H400: Very toxic to aquatic life

Index No. 007-001-01-2, “ammonia….%” EC No. 215-647-6, CAS 1336-21-6
Skin Corrosion 1B, H314: Causes severe burns and eye damage
Aquatic acute 1, H400: Very toxic to aquatic life

Section 11- Toxicological Information

Oral absorption: Rapid and almost complete absorption through GI tract.
Inhalation absorption: Well absorbed based on animal data. Absorption in humans dependent on particle size, deposition/clearance.
Dermal absorption: Low to negligible.
Metabolism: No metabolism. Molybdenum compounds transform quickly to molybdate anions (MoO_4^{2-}) upon dissolution.
Excretion: Rapidly eliminated from plasma predominantly via renal excretion (>80%) and feces (<10%).

Skin corrosion/irritation: Not irritating/not corrosive to the skin.
Serious eye damage/eye irritation: Not irritating/not corrosive to the eyes.
Respiratory or skin sensitization: Not sensitizing to the skin. No data indicating respiratory sensitization.
Germ-cell mutagenicity: Not a germ cell mutagen.
Reproductive toxicity: No reliable scientific data available indicating adverse effects on reproduction or fertility.
STOT-single exposure: No specific target organ effects after single exposure to diammonium dimolybdate.
STOT-repeated exposure: No reliable scientific data available indicating adverse systemic effects after repeated exposure to molybdenum substances.
Aspiration hazard: Not applicable.

Acute toxicity: Low acute toxicity
LD_{50} oral, rat: >2000 mg/kg bw (male/female)
LD_{50} dermal, rat: >2000 mg/kg bw (male/female)
LC_{50} inhalation, rat (4h): >5.0 mg/L (male/female)

Carcinogenicity: Not classified as a carcinogen by NTP, OSHA, or IARC.

Section 12 - Ecological Information

Acute toxicity:

Test Organisms	End-point	Range of values
Freshwater fish: Pimephales promelas	96h-LC_{50}	609-681.4 mg Mo/L 996-1115 mg $(NH_4)_4Mo_8O_{26}$/L
Freshwater fish: Oncorhynchus mykiss	96h LC_{50}	7600 mg Mo/L
Invertebrates: Daphnia magna	48h LC_{50}	1680.4-1776.6 mg Mo/L
Invertebrates: Ceriodaphnia dubia	48h LC_{50}	1005.5-1024.6 mg Mo/L
Invertebrate: Girardia dorotocephala	96h LC_{50}	1226 mg Mo/L

Chronic toxicity:

Test Organisms	Range of values (EC_{10} or NOEC)
Oncorhynchus mykiss, Pimephales promelas, Pseudokirchneriella subcapitata, Ceriodaphnia dubia, Daphnia magna, Chironomus riparius, Brachionus calyciflorus, Lymnaea stagnalis, Xenopus laevis, Lemna minor	43.3-241.5 mg Mo/L
Annelid worms: enchytraeus crypticue, Eisenia Andrei	7.88-1661 mg Mo/kg dw (n=11)
Arthropod: Folsomia candida	37.9-3395 mg Mo/kg dw
Plants: Hordeum vulgare, Brassica napus, Trifolium pretense, Lolium perenne, Lycopersicon esculentum	4-3476 mg Mo/kg dw
Soil microorganisms (nitrification, glucose-induced respiration, plant residure mineralization)	10-3840 mg Mo/kg dw

Conclusion on the environmental classification and labeling: Tetraamonium hexamolybdate is not hazardous to the aquatic environment.

Persistance and degradability: When released into the environment the substance will rapidly dissolve and will be present as the molybdate species under normal environmental conditions.

Bioaccumulative potential: Available BCF/BAF data for the aquatic environment show a distinct inverse relationship with the exposure concentration. This finding demonstrates that molybdenum is homeostatically controlled by these organisms, and this is so up to the milligram range of exposure. Available information on transfer of molybdenum through the food chain indicates that molybdenum does not bio-magnify in aquatic food chains.

Although not homeostatically controlled in terrestrial plants and invertebrates, molybdenum in not largely concentrated from soil into plants or soil to invertebrates. There is no significant concentration increase from diet to mammals to birds. It is concluded that bio-magnification is not significant in the terrestrial food chain.

Mobility in soil: Molybdate originating from tetraamonium hexamolybdate is soluble in water and with is relatively low K_d value, the molybdate ions are leachable through normal soil and are mobile in sediment. Typical log K_d values of 3.25 and 2.94 have been determined for sediment and soil, respectively.

Section 13 - Disposal Considerations

Disposal: Recycle if possible or landfill. This substance is inert and does not require special disposal methods. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101): This product is not classified as dangerous under the transport regulations for road, rail, sea, or air transport.

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number: Not listed (40 CFR 261.33)
RCRA Hazardous Waste Classification: Not classified
CERCLA Hazardous Substance (40 CFR 302.4) Not listed
SARA Toxic Chemical (40 CFR 372.65): Not listed
SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed
SARA Hazard Categories, SARA Sections 311/312 (40 CFR 370.21)
Acute Hazard: No Chronic Hazard: No Fire Hazard: No Reactivity Hazard: No
Sudden Release Hazard: No

OSHA Regulations:

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

TSCA

This substance is on the Chemical Substances Inventory of the Toxic Substance Control Act (TSCA Inventory [USA]).
12(b) export notification: Not listed

State Regulations:

California Proposition 65: Not listed

INTERNATIONAL REGULATIONS

Canada: Listed on DSL
Canadian WHMIS: Uncontrolled product.
China (IECSC): Listed
European Community (EINECS): This product is listed on EINECS, European Inventory of Existing Commercial Chemical Substances, EINECS No. 235-650-6.
Japan (ENCS): Listed
Korea (ECL): This product is listed on ECL, #2004-3-2802.
Taiwan: This product is listed on NECI.

Section 16 - Other Information

Prepared By: Stephanie Nichols
Revision Notes: added CTAOM-FINE

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

C-TEC AOM	C-TEC AOM-FINE	C-TEC AOM-FP

Disclaimer: Information contained herein is presented in good faith and is based on data believed to be accurate. However no warranty is expressed or implied regarding this information or the results obtained from the use of this Material Safety Data Sheet, whether it originates with The R. J. Marshall Company or others. This Safety Data Sheet relates only to the specific material designated herein. It does not relate to use with other material or processes. This information is supplied with the condition that the user will make appropriate determination as to its suitability for their purpose prior to using it.