

Lead(II) molybdate

sc-224039

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Lead(II) molybdate

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave

Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and Canada:
877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Analytical reagent; pigments (component of molybdate oranges).

SYNONYMS

O4-Mo-Pb, "lead molybdate (VI)", "lead molybdate (VI)", "molybdate orange", "molybdic acid, lead salt"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Danger of cumulative effects.

May cause harm to the unborn child.

Possible risk of impaired fertility.

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Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

Harmful by inhalation and if swallowed.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

■ Molybdenum, an essential trace element, can in large doses hamper growth and cause loss of appetite, listlessness and diarrhea. Anemia also occurs, and other symptoms include graying of hair, shrinking of the testicles, reduced fertility and milk production, shortness of breath, incoordination and irritation of the mucous membranes. Symptoms of copper deficiency are also seen.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

■ Skin contact is not thought to produce harmful health effects (as classified using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may be harmful.

■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.

■ Bronchial and alveolar exudate are apparent in animals exposed to molybdenum by inhalation. Molybdenum fume may produce bronchial irritation and moderate fatty changes in liver and kidney.

■ Molybdenum, an essential trace element, can in large doses hamper growth and cause loss of appetite, listlessness and diarrhea. Anemia also occurs, and other symptoms include graying of hair, shrinking of the testicles, reduced fertility and milk production, shortness of breath, incoordination and irritation of the mucous membranes. Symptoms of copper deficiency are also seen.

■ Lead fume is toxic and acts as a cumulative poison. Regular blood testing should be considered for workers who are regularly exposed.

CHRONIC HEALTH EFFECTS

■ Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. This has been demonstrated via both short- and long-term experimentation.

Ample evidence exists that developmental disorders are directly caused by human exposure to the material.

Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.

High levels of molybdenum can cause joint problems in the hands and feet with pain and lameness. Molybdenum compounds can also cause liver changes with elevated levels of enzymes and cause over-activity of the thyroid gland. A generalized feeling of unwellness can occur, with tiredness, weakness, diarrhea, loss of appetite and weight. Molybdenum has been associated with cancers of the airways, but on the other hand, a low intake of molybdenum may cause an increased risk of developing esophageal cancer.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Lead can cross the placenta, and cause miscarriage, stillbirths and birth defects. Exposure before birth can cause mental retardation, behavioral disorders and infant death. Lead can also cause reduced sex drive, impotence, sterility and damage the sperm of males, increasing the potential for birth defects. Periods in women can also be affected.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

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Hazard Alert Code Key:		EXTREME	HIGH	MODERATE	LOW
		Min	Max		
Flammability:	0				
Toxicity:	2				
Body Contact:	0				
Reactivity:	0				
Chronic:	3				
			Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4		
NAME		CAS RN		%	
lead molybdate		10190-55-3		>98	

Section 4 - FIRST AID MEASURES

SWALLOWED



- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- For advice, contact a Poisons Information Center or a doctor.
- Urgent hospital treatment is likely to be needed.
- If conscious, give water to drink.
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

■ If this product comes in contact with the eyes:

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- If pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin or hair contact occurs:

- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED



- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN



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- Gastric acids solubilize lead and its salts and lead absorption occurs in the small bowel.
- Particles of less than 1µm diameter are substantially absorbed by the alveoli following inhalation.
- Lead is distributed to the red blood cells and has a half-life of 35 days. It is subsequently redistributed to soft tissue bone-stores or eliminated. The kidney accounts for 75% of daily lead loss; integumentary and alimentary losses account for the remainder.
- Neurasthenic symptoms are the most common symptoms of intoxication. Lead toxicity produces a classic motor neuropathy. Acute encephalopathy appears infrequently in adults. Diazepam is the best drug for seizures.
- Whole-blood lead is the best measure of recent exposure; free erythrocyte protoporphyrin (FEP) provides the best screening for chronic exposure. Obvious clinical symptoms occur in adults when whole-blood lead exceeds 80 ug/dL.
- British Anti-Lewisite is an effective antidote and enhances fecal and urinary excretion of lead. The onset of action of BAL is about 30 minutes and most of the chelated metal complex is excreted in 4-6 hours, primarily in the bile. Adverse reaction appears in up to 50% of patients given BAL in doses exceeding 5 mg/kg. CaNa2EDTA has also been used alone or in concert with BAL as an antidote. D-penicillamine is the usual oral agent for mobilization of bone lead; its use in the treatment of lead poisoning remains investigational. 2-3-dimercapto-1-propanesulfonic acid (DMPS) and dimercaptosuccinic acid (DMSA) are water soluble analogues of BAL and their effectiveness is undergoing review. As a rule, stop BAL if lead decreases below 50 ug/dL; stop CaNa2EDTA if blood lead decreases below 40 ug/dL or urinary lead drops below 2 mg/24hrs.

[Ellenhorn Barceloux: Medical Toxicology] BIOLOGICAL EXPOSURE INDEX - BEI These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Lead in blood	30 ug/100 ml	Not Critical	
2. Lead in urine	150 ug/gm creatinine	Not Critical	B
3. Zinc protoporphyrin in blood	250 ug/100 ml erythrocytes OR 100 ug/100 ml blood	After 1 month exposure	B

B: Background levels occur in specimens collected from subjects NOT exposed.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not Applicable
Specific Gravity (water=1):	5.9
Lower Explosive Limit (%):	Not Applicable

EXTINGUISHING MEDIA

-
- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

-
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

-
- Non combustible.

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- Not considered to be a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of: metal oxides.

FIRE INCOMPATIBILITY

- None known.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

Environmental hazard - contain spillage.

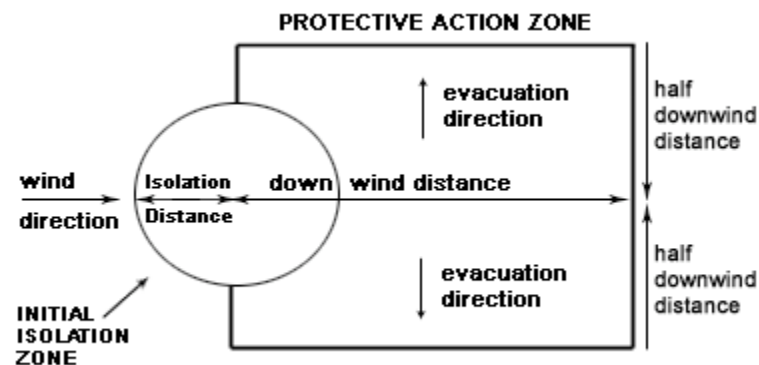
MAJOR SPILLS

- Environmental hazard - contain spillage.

Moderate hazard.

- CAUTION: Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.
- Control personal contact by wearing protective clothing.
- Prevent, by any means available, spillage from entering drains or water courses.
- Recover product wherever possible.
- IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
- ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance -

Downwind Protection Distance 10 meters

FOOTNOTES

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1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 171 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING



- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

RECOMMENDED STORAGE METHODS

■ Glass container.

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

■ Observe manufacturer's storing and handling recommendations.

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SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together

O: May be stored together with specific precautions

+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
US - Idaho - Acceptable Maximum Peak Concentrations	lead molybdate (Lead and its inorganic compounds (Z37.11-1969))		0.2						
Canada - Nova Scotia Occupational Exposure Limits	lead molybdate (Lead - elemental and inorganic compounds (as Pb))		0.05						TLV Basis: central nervous system impairment; peripheral nervous system impairment; hematologic effects. BEI
Canada - Northwest Territories Occupational Exposure Limits (English)	lead molybdate (Lead, inorg., fumes & dusts (as Pb))		0.15		0.45				
US - Oregon Permissible Exposure Limits (Z1)	lead molybdate (Lead, inorganic (as Pb))	0.05							(TWA (See 1910.1025 & 1926.62))
US OSHA Permissible Exposure Levels (PELs) - Table Z1	lead molybdate (Lead, inorganic (as Pb); see 1910.1025)		0.05						If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	lead molybdate (Lead, and inorganic compounds, (as Pb))		0.05						

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Canada - Prince Edward Island Occupational Exposure Limits	lead molybdate (Lead - elemental and inorganic compounds (as Pb))	0.05			TLV Basis: central nervous system impairment; peripheral nervous system impairment; hematologic effects. BEI
US - Michigan Exposure Limits for Air Contaminants	lead molybdate (Lead inorganic (as Pb); see R 325.51901 et seq.F)	0.05			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	lead molybdate (Lead and inorganic compounds, (as Pb))	0.05	0.15		T20
US - Washington Permissible exposure limits of air contaminants	lead molybdate (Lead, inorganic (as Pb) (see WAC 296-62-07521 and 296-155-176))	0.05			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	lead molybdate (Lead, inorganic, fumes and dusts (as Pb))	0.15	-	0.45	
US - Hawaii Air Contaminant Limits	lead molybdate (Lead inorganic (as Pb))	0.05			See 12-202-33.1 and 12-148.1
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	lead molybdate (Lead inorganic (as Pb); see 1910.1025.)		For independent pigments, lead		
US - California Permissible Exposure Limits for Chemical Contaminants	lead molybdate (Lead (metallic) and inorganic compounds, dust and fume, as Pb (see also Section 5198))	0.05			
Canada - Alberta Occupational Exposure Limits	lead molybdate (Lead elemental & inorganic compounds, as Pb)	0.05			
US ACGIH Threshold Limit Values (TLV)	lead molybdate (Lead - elemental and inorganic compounds (as Pb))	0.05			TLV Basis: central nervous system impairment; peripheral nervous system impairment; hematologic effects. BEI
Canada - British Columbia Occupational Exposure Limits	lead molybdate (Lead - elemental and inorganic compounds, as Pb)	0.05			Elemental 2B; R / Other inorganic 2A; R

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US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo) - Total dust)	15			
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo) - Total dust)	10			
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	lead molybdate (Molybdenum (as Mo) - Soluble compounds)	5	-	10	
Canada - Ontario Occupational Exposure Limits	lead molybdate (Molybdenum, as molybdenum Metal and insoluble compounds Soluble compounds - respirable)	0.5			
Canada - Northwest Territories Occupational Exposure Limits (English)	lead molybdate (Molybdenum (as Mo) Insoluble compounds)	10		20	
US - Oregon Permissible Exposure Limits (Z1)	lead molybdate (Molybdenum (insoluble compounds))	10			*
US - Michigan Exposure Limits for Air Contaminants	lead molybdate (Molybdenum, (as Mo) Insoluble compounds)	10			
Canada - Nova Scotia Occupational Exposure Limits	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	10			TLV Basis: lower respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	3			TLV Basis: lower respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	10			TLV Basis: lower respiratory tract irritation
Canada - Nova Scotia Occupational Exposure Limits	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	3			TLV Basis: lower respiratory tract irritation

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Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	lead molybdate (Molybdenum, (as Mo): Metal and insoluble compounds, (inhalable fraction++))	10		20	
US - Washington Permissible exposure limits of air contaminants	lead molybdate (Molybdenum (as Mo) - Insoluble compounds)	10		20	
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	lead molybdate (Molybdenum (as Mo) - Insoluble compounds)	10	-	20	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	lead molybdate (Molybdenum, (as Mo): Metal and insoluble compounds, (respirable fraction++))	3		6	
US - Alaska Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo) Insoluble compounds - Respirable fraction)	5			
US - Alaska Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo) Insoluble compounds - Total dust)	10			
US - Hawaii Air Contaminant Limits	lead molybdate (Molybdenum (as Mo) Insoluble compounds - Total dust)	10		20	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	lead molybdate (Molybdenum (as Mo) - Insoluble compounds; Total dust)	15			
US - Minnesota Permissible Exposure Limits (PELs)	lead molybdate (Molybdenum (as Mo) - Insoluble compounds - Respirable fraction)	5			
US - Minnesota Permissible Exposure Limits (PELs)	lead molybdate (Molybdenum (as Mo) - Insoluble compounds - Total dust)	10			
Canada - Ontario Occupational Exposure Limits	lead molybdate (Molybdenum, as molybdenum Metal and insoluble compounds - respirable)	3			

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US - California Permissible Exposure Limits for Chemical Contaminants	lead molybdate (Molybdenum, insoluble compounds, as Mo - Total dust)	10			
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	lead molybdate (Molybdenum (as Mo) Insoluble compounds Total dust)	10			
US - Idaho - Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo) Soluble compounds)	5 á			
US - California Permissible Exposure Limits for Chemical Contaminants	lead molybdate (Molybdenum, insoluble compounds, as Mo - Respirable fraction (n))	3			
Canada - Alberta Occupational Exposure Limits	lead molybdate (Molybdenum, as Mo - Metal and insoluble compounds, respirable)	3			
US ACGIH Threshold Limit Values (TLV)	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	3			TLV Basis: lower respiratory tract irritation
US ACGIH Threshold Limit Values (TLV)	lead molybdate (Molybdenum - Insoluble compounds (as Mo))	10			TLV Basis: lower respiratory tract irritation
Canada - Alberta Occupational Exposure Limits	lead molybdate (Molybdenum, as Mo - Metal and insoluble compounds, total)	10			
Canada - Ontario Occupational Exposure Limits	lead molybdate (Molybdenum, as molybdenum Metal and insoluble compounds - inhalable)	10			
Canada - British Columbia Occupational Exposure Limits	lead molybdate (Molybdenum - Metal and insoluble compounds, Inhalable)	10			
Canada - British Columbia Occupational Exposure Limits	lead molybdate (Molybdenum - Metal and insoluble compounds, Respirable)	3			

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Canada - Quebec

Permissible

Exposure Values for Airborne Contaminants (English)	lead molybdate (Molybdenum (as Mo)- Insoluble compounds)	10
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US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	lead molybdate (Molybdenum (as Mo)- Insoluble Compounds Total dust)	15
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EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
lead molybdate	5,000	

MATERIAL DATA

LEAD MOLYBDATE:

■ An increased incidence of non-specific symptoms including headache, weakness, fatigue, anorexia and joint and muscle weakness has been reported to occur in mining and metallurgy workers exposed to 60-600 mg (as Mo). Some investigators have attributed gout and elevated uric acid concentration found in some Armenians to result from exposures to Armenian soils rich in molybdenum, whilst exposure has been implicated as a cause of bone disease amongst Indians. "These involvements are speculative". [US National Research Council]. As far as it is known, the recommended TLV-TWA incorporates a large margin of safety against potential pulmonary or systemic effects.

The lead concentration in air is to be maintained so that the lead concentration in workers blood remains below 0.060 mg/100 g of whole blood. The recommended TLV-TWA has been derived following a review of reports of adverse effects on reproduction, blood-pressure and other end-points of toxicity. A particular focus was an assessment of pre-natal blood lead (PbB) levels and post-natal cognitive levels. The fact that lead is a cumulative toxicant which can produce subtle, persistent and apparently permanent effects in the off-spring of lead exposed women is of particular concern. A current view holds that the identification of the PbB levels, that are protective during a working lifetime, is a necessary prerequisite in the recommendation of the TLV because PbB values, rather than workplace air lead concentrations, are more clearly related to adverse health effects. (see Biological Exposure Index - BEI - in "Advice to Doctor").

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

-
- Safety glasses with side shields
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

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Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Overall.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

RESPIRATOR

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow

Explanation of Respirator Codes:

Class 1 low to medium absorption capacity filters.

Class 2 medium absorption capacity filters.

Class 3 high absorption capacity filters.

PAPR Powered Air Purifying Respirator (positive pressure) cartridge.

Type A for use against certain organic gases and vapors.

Type AX for use against low boiling point organic compounds (less than 65°C).

Type B for use against certain inorganic gases and other acid gases and vapors.

Type E for use against sulfur dioxide and other acid gases and vapors.

Type K for use against ammonia and organic ammonia derivatives

Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.

Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.

Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply.

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

Such protection might consist of:

- (a): particle dust respirators, if necessary, combined with an absorption cartridge;
- (b): filter respirators with absorption cartridge or canister of the right type;
- (c): fresh-air hoods or masks

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of

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fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

Sinks in water.

State	Divided solid	Molecular Weight	367.14
Melting Range (°F)	1940- 1958	Viscosity	Not Applicable
Boiling Range (°F)	Not available	Solubility in water (g/L)	Immiscible
Flash Point (°F)	Not Applicable	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Applicable	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not Applicable	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not Applicable	Specific Gravity (water=1)	5.9
Lower Explosive Limit (%)	Not Applicable	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

Yellow powder; does not mix with water. Soluble in nitric acid.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY



- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

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STORAGE INCOMPATIBILITY

■ Metals and their oxides or salts may react violently with chlorine trifluoride. Chlorine trifluoride is a hypergolic oxidizer. It ignites on contact (without external source of heat or ignition) with recognized fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. The state of subdivision may affect the results.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

lead molybdate

TOXICITY AND IRRITATION

■ No significant acute toxicological data identified in literature search.

CARCINOGEN

Lead compounds, inorganic	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2A
Lead and compounds (inorganic)	US EPA Carcinogens Listing	Carcinogenicity	B2
Lead and compounds (inorganic)	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	B2
LEAD COMPOUNDS	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
INORGANIC LEAD COMPOUNDS	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
LEAD COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
INORGANIC LEAD COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
Lead and lead compounds (inhalation)	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	2B
Lead and lead compounds (oral)	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

LEAD MOLYBDATE:

■ Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

■ Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ Lead is primarily an atmospheric pollutant that enters soil and water as fallout, a process determined by physical form and particle size.

Lead in the form of alkyls has been introduced to the environment primarily from leaded petrol. These are converted to water-soluble lead compounds of high toxicity and availability to plants. Such compounds easily leach from soil to contaminate water sources close to highways.

Lead that has entered the aquatic system from run-off or as fallout of insoluble precipitates is found in sediments. The biological methylation of inorganic lead by lake sediment micro-organisms has been demonstrated although its significance is not entirely clear. Other forms of soluble or insoluble lead may also enter the environment and undergo bioaccumulation through a series of biological incidents.

■ DO NOT discharge into sewer or waterways.

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Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Toxicity characteristic: use EPA hazardous waste number D008 (waste code E) if this substance, in a solid waste, produces an extract containing greater than 5 mg/L of lead.

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

† Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury residue in an authorized landfill.
- Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols:	G	Hazard class or Division:	9
Identification Numbers:	UN3077	PG:	III
Label Codes:	9	Special provisions:	8, 146, 335, B54, IB8, IP3, N20, T1, TP33
Packaging: Exceptions:	155	Packaging: Non-bulk:	213
Packaging: Exceptions:	155	Quantity limitations: Passenger aircraft/rail:	No limit
Quantity Limitations: Cargo aircraft only:	No limit	Vessel stowage: Location:	A
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:

Environmentally hazardous substance, solid, n.o.s

Air Transport IATA:

ICAO/IATA Class:	9	ICAO/IATA Subrisk:	藥
UN/ID Number:	3077	Packing Group:	III

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Special provisions: A97

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. *(CONTAINS LEAD MOLYBDATE)

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	3077	Packing Group:	III
EMS Number:	F-A,S-F	Special provisions:	274 909 944
Limited Quantities:	5 kg		

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(contains lead molybdate)

Section 15 - REGULATORY INFORMATION

lead molybdate (CAS: 10190-55-3) is found on the following regulatory lists;

"Canada Domestic Substances List (DSL)", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements", "US TSCA Section 5(a)(2) - Significant New Use Rules (SNURs)"

Section 16 - OTHER INFORMATION

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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