

**Section 1 Company Identification & Chemical Product**

**Product:** Roasted Molybdenite Concentrates; Carbon-Free Briquettes

**Trade Names/Synonyms:** Technical Molybdenum Oxide; Carbon-Free Briquettes; Pressure-Leached Molybdenum Trioxide (PLO)

**Intended Use:** Steel industry; intermediate in various Moly compounds.

**MSDS Creation Date:** 02/26/1985

**Supplier:**

Climax Molybdenum  
One North Central Avenue  
Phoenix, Arizona 85004 USA

**Emergency Information**

Contact: 602-366-8100  
CHEMTREC: 800-424-9300  
FAX: 602-366-7309

**Section 2 Hazards Identification**

**Emergency Overview:** Harmful. Roasted Molybdenite Concentrates are odorless, white to yellow to blue solids. No known fire or reactivity hazard. As with all dry bulk materials, fine dusts, mists and/or fumes may cause minor irritation to the eyes and respiratory system. Avoid conditions, which result in airborne levels of material in excess of the TLV without proper protective equipment. For additional information on toxicity, please refer to Section 11. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.

*Potential Health Effects* <sup>(1)</sup>

**Acute Health Effects**

**Swallowed:** Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

**Eye:** Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions that are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterized by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

**Skin:** Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-

four hours or more after the end of the exposure period.

Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (non-allergic). The dermatitis is often characterized by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

**Inhaled:** The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

### **Chronic Health Effects**

Danger of cumulative effects. Substance has potential to accumulation, in the human body and may cause some concern following repeated or long-term occupational exposure. Cattle, rabbits, and chicks on high dietary levels of molybdenum exhibited deformities of joints of the extremities. Chronic exposure of workers in Russian molybdenum-copper plant resulted in a fall in the albumin/globulin ratio owing to a rise in globulins (particularly alpha-globulins) which is interpreted as evidence of liver dysfunction with hyperbilirubinaemia. Hepatotoxic effects are also found in animals given molybdenum salts with a rise in alpha-globulin levels, hypoalbuminaemia and increased serum bilirubin reported. Other reported biochemical effects include an early depletive effect on the nicotinamide nucleotides, hyper aminoaciduria, reduction in red blood cell life-span and hyper-thyroidism. Industrial exposure to some insoluble molybdenum compounds is thought to have resulted in an increased incidence of weakness, fatigue, anorexia, headache and joint and muscular pain. Animals exposed to certain insoluble molybdenum compounds show anorexia, diarrhea, weight loss, listlessness, and liver and kidney damage. Molybdenum disturbs bone metabolism, giving rise to lameness, bone joint abnormalities, osteoporosis and high serum phosphatase levels.

Under the conditions of a 2-year inhalation study there was equivocal evidence of carcinogenic activity of molybdenum trioxide in male rats, male mice and female mice based on a marginally significant positive trend of alveolar/bronchiolar adenoma or carcinoma. There was no evidence of carcinogenic activity in female rats exposed to 10, 30 and 100 mg/m<sup>3</sup>. Exposure of male and female rats to molybdenum trioxide by inhalation resulted in increased incidences of chronic alveolar inflammation, hyaline degeneration of the olfactory epithelium (females), hyaline degeneration of the respiratory epithelium and squamous metaplasia of the epiglottis. Exposure of female and male mice to molybdenum trioxide resulted in an increased incidence of metaplasia of the alveolar epithelium, histiocyte cellular inflammation (males), hyaline degeneration of the respiratory epithelium, hyaline degeneration of the olfactory epithelium (females), squamous metaplasia of the epiglottis, and hyperplasia of the larynx. Molybdenum trioxide was not mutagenic in any of five strains of *Salmonella typhimurium* and did not induce sister chromatid exchanges or chromosomal

aberrations in cultured Chinese hamster ovary cells in vitro. All tests were conducted with or without S9 metabolic activation enzymes. National Toxicology Program: Technical Report Series 462, April 1997.

In general, repeated exposures in an occupational setting, to high levels of any fine-divided dust may produce a condition known as pneumoconiosis that is the lodgment of any inhaled dust in the lung irrespective of the effect. This is particularly true when a significant number of particles less than 0.5 microns (1/50,000 inch), are present. Lung shadows are seen in the X-ray. Symptoms of pneumoconiosis may include a progressive dry cough, shortness of breath on exertion, increased chest expansion, weakness and weight loss. As the disease progresses the cough produces a stringy mucous, vital capacity decreases further and shortness of breath becomes more severe. Pneumoconiosis is the accumulation of dusts in the lungs and the reaction in its presence. It is further classified as being of non-collagenous or collagenous types. Non-collagenous pneumoconiosis, the benign form, is identified by minimal stromal reaction consists mainly of reticulin fibers, an intact alveolar architecture and is potentially reversible.

**Carcinogenic\* Status:** NTP – Not Listed; IARC – MoO<sub>3</sub> is listed; OSHA – Not Listed; ACGIH – Not Listed; EPA – Not Listed; MAK – Not Listed

**\* Note:**

- Molybdenum is an essential element in the human body, **lack of sufficient** Molybdenum in the soil used for farming in one province of China has revealed a risk of increase esophageal cancer in one study. <sup>(4)</sup> Deficiency of molybdenum may be one of the risk factors in gastric cancer too.
- Low molybdenum intake is attributed to the high incidence of esophageal cancer in South Africa among the Bantu of Transkei and in Russia but this maybe related to a lack of Mo in the soil used in farming. Another study of soft and hard drinking water in Taiwan indicated an increase risk of esophageal cancer when drinking soft water. <sup>(5)</sup>

**UK Hazard Classification:** Harmful

<b>Section 3</b>	<b>Composition/Information on Ingredients</b>
------------------	---

**Note** – CAS# 86089-09-0 contains varying percentages of mainly insoluble MoO<sub>2</sub> (CAS# 18868-43-4) and slightly soluble MoO<sub>3</sub> (CAS # 1313-27-5). There is very small amounts of other oxides of Molybdenum. MoO<sub>3</sub> is the largest percentage of the roasted concentrate. (CAS# 86089-09-0 is not found on the TSCA inventory but both components are on the TSCA list.)

<u>CAS #</u>	<u>Component:</u>	<u>Exposure limits</u>	<u>% By Weight</u>
86089-09-0	Roasted Molybdenite Concentrates, MoO <sub>2</sub> and MoO <sub>3</sub>	(as Insoluble Mo) US OSHA PEL (t) TWA: 15 mg/m <sup>3</sup> US ACIGH TLV(i) TWA: 10 mg/m <sup>3</sup> US ACIGH TLV(r) TWA: 3 mg/m <sup>3</sup> US NOISH REL: None	100

US NOISH STEL: None  
US IDLH: 5000 mg/m<sup>3</sup>  
UK WEL TWA: 10 mg/m<sup>3</sup>  
UK WEL STWL: 20 mg/m<sup>3</sup>

(as Soluble Mo)  
US OSHA PEL (t) TWA: 5 mg/m<sup>3</sup>  
US ACGIH TLV (r) TWA: 0.5 mg/m<sup>3</sup>  
US NIOSH REL: None  
US NIOSH STEL: None  
US IDLH: 1000 mg/m<sup>3</sup>  
UK WEL TWA: 10 mg(Mo)/m<sup>3</sup>  
UK WEL STEL: 20 mg(Mo)/m<sup>3</sup>

**Chemical Family:** Metal Oxide  
**EINECS Number:** 289-178-0  
**Classification:** Xn, (Xi optional)  
**Risk Phrases:** R 36/37, R 40 (see Section 16 for Phrase information)  
**Safety Phrases:** S 22, S 36/37

**Relevant Hazard Symbol:**



<b>Section 4</b>	<b>First Aid Measures</b>
------------------	---------------------------

**Ingestion:** Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, keep head lower than hips to prevent aspiration of vomit into air passages of the lung. Seek medical attention.

**Inhalation:** Remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Seek medical attention.

**Skin Contact:** Remove contaminated clothing and shoes. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention, if needed.

**Eye Contact:** Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.

**Notes to Physician:** This product is anticipated to have low oral toxicity and may be irritating to eyes, skin and mucous membranes. Treat symptomatically and supportively.

**Special Precautions/Procedures:** Treat symptomatically and supportively.

<b>Section 5</b>	<b>Fire Fighting Measures</b>
------------------	-------------------------------

**Flash point:** Not Applicable  
**LEL:** Not Applicable  
**UEL:** Not Applicable

**Auto-ignition Temp:** Not Applicable

**Flammability:** Not Applicable

**Fire And Explosion Hazard:** Negligible fire hazard when exposed to heat or flame.

**Extinguishing Media:** Dry chemical, carbon dioxide, water spray or regular foam suitable for surrounding fire conditions. For larger fires use water spray, fog or regular foam.

**Firefighting:** Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Extinguish using agent indicated; do not use water stream directly on material. If large amounts of combustible materials are involved, use water spray or fog in flooding amounts. Avoid breathing corrosive dusts and fumes from burning material, keep upwind.

**Specific Hazards:** None

**Exposure Hazards(s):** Harmful solid/dust

**Hazardous Combustion Products:** None

## Section 6

## Accidental Release Measures

**Precautions:** Use respiratory protection, safety glasses, safety shoes and impervious gloves.

**Spill:** Sweep up, place in a bag and hold for waste disposal. Avoid generating Dust. Ventilate area and wash spill site after material pickup is complete

### *EU/UK information*

**Environmental Precautions:** "Molybdenum and its compounds are List II substances under the Groundwater Directive. If the substance enters watercourses or sewer, inform the appropriate local water authority or Regulatory body immediately."

## Section 7

## Handling And Storage

**Handling:** Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

**Storage:** Observe national and regional provisions in force. Store away from incompatible materials. Material may be light sensitive in the presence of moisture. Keep material tightly sealed in the original container and away from sun light.

**Incompatible Materials:** Chlorine trifluoride, lithium, magnesium, potassium and sodium.

**Regulatory Requirements:** In the UK, employers should be aware of their duties under regulations 6 and 7 of the Control of Substances Hazardous to Health Regulations 2002 to carry out risk assessments and apply protection measures to the activity being

carried out.” See this web site for more information. <http://www.coshh-essentials.org.uk/>

<b>Section 8</b>	<b>Exposure Controls/Personal Protection</b>
------------------	--

**Engineering Controls:** Make available safety shower and eyewash station. Use Mechanical exhaust ventilation system.

**Respirator Protection:** If ventilation is not available, wear a respirator. Proper respirator usage requires a written respirator program that includes at least: Medical certification, training, fit testing, change out schedule, selection, periodic environmental monitoring, maintenance, inspection, cleaning and convenient sanitary storage areas.

**Respirator Selection: As recommended by NIOSH/OSHA**

<b>Up to 25 mg/m<sup>3</sup>:</b>	APF = 5	Any dust and mist respirator
<b>Up to 50 mg/m<sup>3</sup>:</b>	APF = 10	Any dust and mist respirator except single-use and quarter-mask respirators
	APF = 10	Any supplied-air respirator
<b>Up to 125 mg/m<sup>3</sup>:</b>	APF = 25	Any supplied-air respirator operated in a continuous-flow mode
	APF = 25	Any powered, air-purifying respirator with a dust and mist filter
<b>Up to 250 mg/m<sup>3</sup>:</b>	APF = 50	Any air-purifying, full-face piece respirator with a high-efficiency particulate filter
	APF = 50	Any supplied-air respirator that has a tight-fitting face piece and is operated in a continuous-flow mode
	APF = 50	Any powered, air-purifying respirator with a tight-fitting face piece and a high-efficiency particulate filter
	APF = 50	Any self-contained breathing apparatus with a full face piece
	APF = 50	Any supplied-air respirator with a full-face piece
<b>Up to 1000 mg/m<sup>3</sup>:</b>	APF = 2000	Any supplied-air respirator that has a full-face piece and is operated in a pressure-demand or other positive-pressure mode

**Emergency or planned entry into unknown concentrations or IDLH conditions:**

APF = 10,000 Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.

**Escape:** APF = 50 - Any air-purifying, full-face piece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

**Warning!** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**For Firefighting and Other Immediately Dangerous To Life or Health Conditions:** Use any self-contained breathing apparatus that has a full-face piece and is operated in a pressure-demand or other positive-pressure mode. Use any supplied-air respirator that has a full-face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

**Eye Protection:** Employee should wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

**Clothing:** Employee should wear appropriate protective clothing and equipment to prevent repeated or prolonged skin contact with this substance.

**General Hygiene Measure:** Wash thoroughly after handling. Wash contaminated clothing before reuse.

**Ventilation:** Provide local exhaust or process enclosure ventilation to meet published exposure limits.

**Gloves:** Employee should wear appropriate protective gloves to prevent contact with this substance.

**Health and Safety Controls in the UK:** The user should check the Health and Safety Executive's guidance on respiratory protection, personal protective equipment and occupational exposure limits and ensure compliance with the Health and Safety at Work Act 1974 (as amended), the Control of Substances Hazardous to Health Regulations 2002 (as amended) and other health and safety legislation relevant to the use of the product.

#### **UK Occupational Exposure Limits:**

Molybdenum Trioxide – UK WEL TWA : 10 mg/m<sup>3</sup>  
UK WEL STEL : 20 mg/m<sup>3</sup>  
(see section 15 for other country limits)

**Environmental Exposure Controls in the UK:** The user should ensure that their processes are compliant with the provisions of the Environmental Protection Act 1990 and other legislation relevant to the intended use of the product. Further information can be obtained by contacting Envirowise on the Environment and Energy national helpline at 0800 585794 or at the website, <http://www.envirowise.gov.uk>.

### **Section 9**

### **Physical And Chemical Properties**

**Physical State:** Solid  
**Appearance:** Colorless to white or slightly yellow to bluish powder, granules or rhombic crystals.  
**Surface Area:** Not/Available

<b>Odor:</b>	Odorless
<b>Molecular Weight:</b>	143.94 typical (MoO <sub>3</sub> ), 127.94 typical (MoO <sub>2</sub> )
<b>Molecular Formula:</b>	MoO <sub>3</sub> , MoO <sub>2</sub> , Mo <sub>4</sub> O <sub>11</sub>
<b>pH:</b>	Not/Available
<b>Flammability:</b>	None
<b>Flash Point:</b>	None
<b>BP/BP Range:</b>	1150°C (2102°F) sublimes @ 700°C (1292°F)
<b>MP/MP Range:</b>	795°C (1463°F)
<b>Freezing Point:</b>	Not/Available
<b>Vapor Pressure:</b>	Not/Available
<b>Vapor Density:</b>	Not/Available
<b>Saturated Vapor Conc.:</b>	Not/Available
<b>SG/Density:</b>	4.692
<b>Bulk Density:</b>	Not/Available
<b>Odor Threshold:</b>	Not/Available
<b>% Volatile:</b>	Not/Available
<b>VOC Content:</b>	Not/Available
<b>Water Content:</b>	Not/Available
<b>Solvent Content:</b>	Not/Available
<b>Evaporation Rate:</b>	Not/Available
<b>Viscosity:</b>	Not/Available
<b>Surface Tension:</b>	Not/Available
<b>Partition Coefficient:</b>	Not/Available
<b>Decomposition Temp:</b>	Not/Available
<b>Refractive Index:</b>	Not/Available
<b>Molecular Formula:</b>	MoO <sub>3</sub>
<b>Optical Rotation:</b>	Not/Available
<b>Water Solubility:</b>	Slightly soluble in water 0.22% @ 28°C after stirring 24 to 48 hours.
<b>Solvent Solubility:</b>	Soluble in concentrated mixtures of nitric and hydrochloric acid, concentrated nitric and sulfuric acids, ammonium or potassium bitartrate, ammonia hydroxide, alkali hydroxides, sulfuric acid.

**Section 10**

**Stability and Reactivity**

**Stability/Polymerization:** Stable under normal temperatures and pressures. Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

**Incompatibilities:**

<b>Aluminum powder:</b>	Reacts
<b>Bromine Pentafluoride:</b>	Violent reaction which may ignite
<b>Chlorine Trifluoride:</b>	Violent reaction which may ignite
<b>Lithium:</b>	Reacts
<b>Magnesium:</b>	When heated a violent detonation may occur
<b>Potassium:</b>	Reacts with incandescence
<b>Sodium:</b>	Reacts violently

**Hazardous Decomposition:** Non hazardous



**Section 11**

**Toxicology Information**

**Roasted Molybdenite Concentrates:** >5000 mg/kg oral LD<sub>50</sub>-rat; >3.92 mg/l estimated inhalation LC<sub>50</sub>(4 hour)-rat; >2000 mg/kg LD<sub>50</sub> dermal-rat.

**Carcinogen Status:** No data available.

**Local Effects:** Irritant to eyes, respiratory tract and skin.

**Target Effects:** Poisoning may affect liver, kidneys and lungs.

**At Increased Risk From Exposure:** Persons with decreased pulmonary function.

**Acute Effects:** The oral LD<sub>50</sub> for rat is >5000 mg/kg.

**Chronic Effects:** Some Roasted Molybdenite concentrates have been reported to cause fibrosis, focal pneumoconiosis, and cough in humans.

**Section 12**

**Ecological Information**

**Acute Toxicity To Fish:** Tests on Rainbow trout conducted in compliance with UK, US, Japanese and OECD GLP Standards, established a " No observed effect level " of 32 mg/l.

**Toxicity To Daphnids:** Tests on Daphnia magna, conducted in compliance with UK, US, Japanese and OECD GLP Standards, established a " No effect " level at 24 hours of 56 mg/l and a "No effect " level at 48 hours of 18 mg/l.

**Algae Growth Inhibition:** Tests on Scenedesmus subspicatus, conducted in compliance with UK, US, Japanese and OECD GLP Standards, established a " No observed effect level " greater than or equal to 100 mg/l.

**Effect On Activated Sewage Sludge:** Tests on mixed population of activated sewage sludge micro-organism, conducted in compliance with UK, US, Japanese and OECD GLP Standards, established EC<sub>50</sub> (30 minutes): 4050 mg/l and EC<sub>50</sub> (3 hours): 3000 mg/l.

**Mobility:** Not available

**Persistence and Degradability:** Not available

**Bioaccumulation:** Not available

**Other adverse effects:** Unknown

**Chemical Fate:** Unknown

**Section 13**

**Disposal Information**

**Appropriate Method of Disposal of Substance or Preparation:** Bury in a landfill site approved for the disposal of chemical and hazardous wastes. Observe federal, state, and local environmental codes. Recycle whenever possible.

**Disposal in the UK:** Waste should be disposed of via a licensed waste contractor. Do not

discharge into local watercourses/sewers or allow contaminating underground water sources. In disposing of waste or surplus concentrate in the UK, the user should have regard to the Waste Framework Directive (75/442/EEC) (as amended), the Hazardous Waste Directive (91/689/EEC) (as amended) and all of the relevant implementing legislation in the UK.

The user should also refer to the Environmental Protection Act 1990, the Environment Act 1995, the Special Waste Regulations 1996 and all associated statutory instruments and guidance. Any waste holder who is uncertain of which legislation applies should contact their local Environment Agency Office.

**Disposal outside of the UK:** The user should have regard to any local legislation which is applicable to the disposal of waste from this product.

<b>Section 14</b>	<b>Transportation Information</b>
-------------------	-----------------------------------

***US DOT Transportation Data (49 CFR 172.101)***

**Proper Shipping Name:** none

**Non-Hazardous for Transport:** Non-hazardous. Not regulated.

***IATA***

**Non-Hazardous for Air Transport:** Non-hazardous. Not regulated

***Canada***

**Canadian Transportation of Dangerous Goods:** No classification assigned.

***UK/EU Guidance***

**Transportation:** The product is not individually listed in the United Nations/Economic Commission for Europe (ECE) agreement, ADR<sup>(2)</sup> 2005, Volume I, Table A or B of Chapter 3.2. The user is advised to consider the physical, chemical and physiological properties of the product in light of the classification criteria set out within ADR to ascertain whether the product is considered to be dangerous for carriage under UK/EU laws.

The user is also advised to refer to the HSE/Department of Transport guide 'Working with ADR: an introduction to the carriage of dangerous good by road' and the HSG guide HSG136 "Workplace Transport Safety: Guidance for Employers." Additional help can be found at the web site – [www.unece.org/trans/danger/publi/adr/adr\\_e.html](http://www.unece.org/trans/danger/publi/adr/adr_e.html).

<b>Section 15</b>	<b>Regulatory Information</b>
-------------------	-------------------------------

***US-Classification and Label Text***

**Label information:** Molybdenum Concentrate (Contains Molybdenum trioxide)

**Indication of Danger:** Harmful.

**Risk Statements:** Danger of serious damage to health by prolonged exposure through inhalation and if swallowed. Irritating to eyes and respiratory system.

**Safety Statements:** Do not breathe dust. Avoid contact with the eyes. Wear suitable protective clothing.

### ***United States Regulatory Information***

#### ***US Federal***

**RCRA:** This product does not contain ingredients that could enable it to potentially become a Hazardous Waste, as defined in 40 CFR 260.10 if the product is discarded.

**Clean Air Act:** This product does not contain ingredients identified as Hazardous Air Pollutants in CAA Section 112(b).

**Clean Water Act:** This product does not contain compounds identified in 40 CFR 116.4.

**Safe Drinking Water Act:** Not listed

**EPCRA, SARA Title III, Section 312 and 313 (chemicals subject to reporting requirements, see Section II for CAS number and percentage in mixture):** Section 312 and/or 313 reporting is required for this product.

**CERCLA:** CERCLA reporting for releases of this product into the environment is not required.

**TSCA:** Not listed, a mixture. Components found on inventory. Mainly MoO<sub>3</sub> (80 to 99%).

**TSCA 12(b) export notification:** Not listed.

**DOT:** See Section 14 Transport Information

**CERCLA Section 103 (40 CFR 302.4):** Not regulated.

**SARA Section 302 (40 CFR 355.30):** Not regulated. (TPQ)

**SARA Section 304 (40 CFR 355.40):** Not regulated. (RQ)

**SARA Acute Hazard:** No

**SARA Chronic Hazard:** No

**SARA Fire Hazard:** No

**SARA Reactivity Hazard:** No

**SARA Sudden Release Hazard:** No

#### ***U.S. State Regulations***

**California Prop 65 Status:** Moly Concentrate is not currently listed

#### ***Canadian Regulatory Information***

**WHMIS Classification:** This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

**DSL:** Yes  
**NDSL:** No

**Imports to the UK – Supply and Labeling**

**Listed on the Approved Supply List:** No

**Product falls within one of the categories of danger specified in Column 1 of Schedule 1 to the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002:** Yes

**Substance:** Moly Concentrate, Roasted (contains MoO<sub>3</sub>)  
**CAS No.:** 86089-09-0  
**EINECS No.:** 289-178-0

**Hazard Classification:** Xn – Harmful, (Optional - Xi, Irritating)

**Hazard Pictogram:** 

**Risk Phrases:** **R 36/37** Irritating to eyes and respiratory system.  
**R 40** Limited evidence of a carcinogenic effect.

**Safety Phrases:** **S 22** Do not breathe dust.  
**S 36/37** Avoid contact with skin and eyes.

**Directive 76/464/EEC:** Molybdenum and its compounds are List II substances.

**Groundwater Directive 80/68/EEC:** Molybdenum and its compounds are List II Substances.

**Other country occupational exposure limits** (soluble Mo)

US MSHA TWA	5 mg(Mo)/m <sup>3</sup>	1971
OEL-Australia TWA:	5 mg(Mo)/m <sup>3</sup>	JAN1993
OEL-Austria MAK:	15 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Belgium TWA:	5 mg(Mo)/m <sup>3</sup>	JAN1993
OEL-Denmark TWA:	5 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Finland TWA:	5 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-France VME:	5 mg(Mo)/m <sup>3</sup>	
OEL-France VLE:	10 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Germany MAK:	15 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-The Netherlands MAC-TGG:	5 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-The Philippines TWA:	5 mg(Mo)/m <sup>3</sup>	JAN1993
OEL-Poland MAC(TWA):	4 mg(Mo)/m <sup>3</sup>	
OEL-Poland MAC(STEL):	10 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Sweden (t) NGV:	10 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Sweden (r) NGV:	5 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Switzerland MAK-W:	10 mg(Mo)/m <sup>3</sup>	JAN1999
OEL-Turkey TWA :	5 mg(Mo)/m <sup>3</sup>	JAN1993

OEL In Argentina, Bulgaria, Colombia, Jordan, Korea check ACGIH TLV

OEL In New Zealand Singapore, Vietnam check ACGIH TLV

DFG MAK (t) TWA: 5 mg/m<sup>3</sup>  
DFG MAK (30 minute peak, average value, 1 time/shift): 50 mg/m<sup>3</sup>

**Relevant Legislation:**

**EU Directives:** Waste Framework Directive (75/442/EEC)  
Hazardous Waste Directive (91/689/EEC)  
Council Directive 76/769/EEC  
Council Directive 76/464/EEC  
Groundwater Directive (80/68/EEC)  
Directive 2003/28/EC (transport of dangerous goods by road)  
Directive 2003/29/EC (transport of dangerous goods by rail)  
Directive 1999/36/EC (transportable pressure equipment)

**UK Acts of Parliament:** The Environmental Protection Act 1990 (as amended)  
Environment Act 1995 (as amended)  
The Health and Safety at Work Act 1974 (as amended)

**UK Regulations:** Control of Substances Hazardous to Health Regulations 2002  
(as amended)  
Control of Major Accident Hazards Regulations 1999  
Groundwater Regulations 1998  
Special Waste Regulations 1996  
Health and Safety (First Aid) Regulations 1981  
Personal Protective Equipment Regulations 2002  
Personal Protective Equipment at Work Regulations 1992  
The Carriage of Dangerous Goods and Use of Transportable Pressure  
Equipment Regulations 2004.

**Note -** In addition to the principal legislation referred to above the user should also refer to other acts and implementing environmental and health and safety legislation and guidance that are relevant to the intended handling or use of the product.

**UK Guidance:** UK HSE Guidance Note "*COSHH Essentials: Easy Steps to Control Chemicals*" HSG193 HSE Books

HSE guide HSG53 "The selection, use and maintenance of respiratory protective equipment: A Practical Guide."

HSE guide HSG136 "Workplace transport safety: Guidance for Employers"

The HSE/Department of Transport Guide "Working with ADR: An introduction to carriage of dangerous goods by road"

First aid at work. The Health and Safety (First-Aid) Regulations 1981.  
Approved Code of Practice and Guidance L74 HSE Books

“Occupational Exposure Limits EH40 HSE Books 2001

**Other guidance**

**European Priority Lists Information:** This chemical substance is not listed in a priority list (as foreseen under Council Regulation (EEC) No. 793/93 on the evaluation and control of risks of existing substances).

**HPV-LPV (High and Low Production Volume) Information:** Yes

**Classification and labeling information:** This chemical substance is not classified in the Annex I of Directive 67/548/EEC. (**Note** – Yes, Annex I Index # 042-001-00-9, Substance Name – molybdenum trioxide.)

**IUCLID Chemical Data Sheet Information:** Available for this substance.

**European Risk Assessment Information:** Not available for this substance.

<b>Section 16</b>	<b>Other</b>
-------------------	--------------

**Note:** The end user should verify the suitability in using the supplied HMIS <sup>(3)</sup> rating for their condition of end use.

**HMIS (II) Rating:** Health 1; Fire 0; Reactivity 0; Personal Protection E

**HMIS (III) Rating:** Health \*1; Fire 0; Physical Hazard 0; Personal protection E

**NFPA Rating:** Health 1; Flammability: 0; Instability: 0

**Creation Date:** 26 Feb 1985                      **Last Revision:** 14 Feb 2008

**Current Revision Date:** 17 June 2009

**Reason for Revision:** Logo added with registered trademark

**References**

- 1) Information provided by earlier Climax Molybdenum Company MSDS, 1985. References not confirmed.
- 2) "ADR" means the provisions concerning the international carriage of dangerous goods by road which form Annexes A and B to the European Agreement Concerning the International Carriage of Dangerous Goods by Road and are contained in Annexes A and B to Council Directive 94/55/EC (as amended).
- 3) HMIS stands for Hazards Material Information System developed and periodically updated by the National Paint and Coating Association. The most widely used version is HMIS (II). The Latest version is HMIS (III) and has not been widely adopted as of 1/1/2004.

- 4) Blot WJ, Li JY, Taylor PR, et al. Nutrition intervention trials in Linxian, China: supplementation with specific vitamin/mineral combinations, cancer incidence, and disease-specific mortality in the general population. *J Natl Cancer Inst.* 1993; 85:1483-1492.
- 5) Esophageal cancer mortality and total hardness levels in Taiwan's drink water - Authors CY Yang, HF Chiu, MF Cheng, SS Tsai, CF Hung, MC Lin Full source Environmental Research, 1999, Vol. 81, Iss 4, pp 302-308

### **REACH summary**

Climax Molybdenum has pre-registered this substance under the EU REACH regulation and intends to pursue full registration by the December 1, 2010 deadline. Any questions relative to this substance under REACH should be directed to Mr. Ken Kloska at Ken\_Kloska@FMI.com.

### **Disclaimer**

This safety data sheet and the information it contains is offered in good faith as accurate. We have reviewed any information contained in this data sheet that we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe on existing patents. No warranty is made, either express or implied.