Safety Data Sheet

Version 1.4
Revision Date 10/20/2024

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	**Molybdenum Trioxide, Enriched Molybdenum Trioxide**
Chemical Formula	MoO_3
Molecular Weight	143.94 amu
CAS No.	1313-27-5
RTECS No.	QA4725000
Synonyms	Molybdic anhydride; molybdic trioxide; molybdenum oxide
Supplier Address*	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053 *May include subsidiaries or affiliate companies/divisions
Email	iusa@isoflex.com
Website	www.isoflex.com
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

2. HAZARDS IDENTIFICATION

Emergency Overview:

Warning! Harmful if swallowed or inhaled. Causes irritation to skin, eyes and respiratory tract.

OSHA Hazards: Target Organ Effect, Irritant, Carcinogen

Target Organs: Liver, Kidney

GHS Classification: Acute toxicity, Oral (Category 5); Acute toxicity, Inhalation (Category 5); Acute toxicity, Dermal (Category 5); Eye irritation (Category 2A); Carcinogenicity (Category 2); Specific target organ toxicity - single exposure (Category 3), Respiratory system

NFPA Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 **Flammability = 0** **Reactivity = 0**

HMIS Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 2 **Flammability = 0** **Physical Hazard = 0**

HEALTH HAZARD	2
FLAMMABILITY	0
PHYSICAL HAZARD	0

Lab Protective Equipment	Goggles; lab coat
Storage Color Code	Orange (General Storage)

Potential Health Effects

Inhalation	May be harmful if inhaled; causes respiratory tract irritation
Skin	May be harmful if absorbed through skin; causes skin irritation
Eyes	Causes eye irritation
Ingestion	May be harmful if swallowed

For additional information on toxicity, please refer to Section 11.

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3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical No.:	Molybdenum Trioxide
CAS No.:	1313-27-5
Chemical Formula:	MoO_3
Molecular Weight:	143.94 amu

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4. FIRST AID MEASURES

Oral Exposure	Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Inhalation Exposure	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Dermal Exposure	Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Exposure	Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. FIREFIGHTING MEASURES

Flash Point	N/A
Autoignition Temperature	N/A
Flammability	N/A
Suitable Extinguishing Media	Use any means suitable for extinguishing surrounding fire
Fire	Not considered to be a fire hazard
Special Information	In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8.
Environmental Precautions	Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Methods for Cleaning Up	Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

7. HANDLING AND STORAGE

Handling	Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.
Storage	Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Personal Protective Equipment

Ventilation System	A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document *Industrial Ventilation, A Manual of Recommended Practices,* most recent edition, for details.
Personal Respirators	If the exposure limit is exceeded and engineering controls are not feasible, *(NIOSH Approved)*a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection	Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.
General Hygiene Measures	Wash thoroughly after handling.

Exposure Limits

OSHA Permissible Exposure Limit (PEL):

5 mg/m^3 for soluble molybdenum compounds as Mo

15 mg/m^3 total dust, for insoluble molybdenum compounds as Mo

ACGIH Threshold Limit Value (TLV):

Molybdenum, metal and insoluble compounds, inhalable fraction, as Mo: 10 mg/m^3
Molybdenum, metal and insoluble compounds, respirable fraction, as Mo: 3 mg/m^3

Molybdenum, soluble compounds, respirable fraction, as Mo: 0.5 mg/m^3, **A3** - Confirmed animal carcinogen with unknown relevance to humans

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical State	Solid
Form	Powder or Granules
Color	White or slightly yellow to blue
Odor	Odorless

Safety Data

Molecular Weight:	143.94 amu	pH: N/A	
BP/BP Range:	1150 °C (2102 °F)	MP/MP Range:	795 °C(1463 °F). Begins to sublime @700 °C(1292 °F)
Freezing Point:	N/A	Vapor Pressure:	N/A
Vapor Density:	N/A	Saturated Vapor Concentration:	N/A
SG/Density:	4.69 g/cm3	Bulk Density:	N/A
Solubility:	0.107 g/100 g water @ 18 °C	Volatile%:	N/A
VOC Content:	N/A	Water Content:	N/A
Solvent Content:	N/A	Evaporation Rate:	N/A
Viscosity:	N/A	Surface Tension:	N/A
Partition Coefficient:	N/A	Decomposition Temperature:	N/A
Flash Point:	N/A	Explosion Limits:	N/A
Flammability:	N/A	Autoignition Temperature:	N/A
Refractive Index:	N/A	Optical Rotation:	N/A
Miscellaneous Data:	N/A	Solubility in Water:	N/A

10. STABILITY AND REACTIVITY

Stability	Stable under ordinary conditions of use and storage; sublimes at high temperatures
Incompatible Materials	Incompatible with alkali metals, most common metals and oxidizing agents. Explodes on contact with molten magnesium. Violent reaction with interhalogens (e.g., bromine pentafluoride; chlorine trifluoride). Incandescent reaction with hot sodium, potassium or lithium.
Conditions to Avoid	Incompatible materials
Materials to Avoid	Strong oxidizing agents May react violently on mixing with phosphorous pentachloride, chlorine trifluoride, or bromine pentafluoride.
Hazardous Decomposition Products	Toxic metal fumes may form when heated to decomposition.
Hazardous Polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure

Skin Contact	Causes irritation to skin. Symptoms include redness, itching, and pain. Causes rash that is difficult to heal.
Eye Contact	Causes irritation, redness, and pain
Ingestion	Toxic material. Large doses can cause severe distress, cramping, vomiting, and hypertension.
Inhalation	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May be absorbed into the bloodstream with symptoms similar to ingestion. May cause pulmonary disorders.
Chronic Exposure	No specific information found. Molybdenum is rapidly excreted from the body. Persons exposed for long periods suffer from anemia.
Aggravation of Pre-existing Conditions	Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

Acute Toxicity

Oral - Rat LD50	2689 mg/kg
Inhalation - Rat LC50	> 5840 mg/m^3/4H. Investigated as a tumorigen.
Germ Cell Mutagenicity	Genotoxicity in vitro - Ames test - *S. typhimurium* - with and without metabolic activation - negative

Carcinogenicity

Carcinogenicity - Rat – Inhalation. Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration: Tumors. Limited evidence of a carcinogenic effect.

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible or confirmed human carcinogen by IARC.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive Toxicity	No data available
Teratogenicity	No data available
Specific Target Organ Toxicity / Single Exposure (Globally Harmonized System)	May cause respiratory irritation
Specific Target Organ Toxicity / Repeated Exposure (Globally Harmonized System)	No data available
Aspiration Hazard	No data available
Signs and Symptoms of Exposure	To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Synergistic Effects	No data available
Additional Information	RTECS: QA4725000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to Fish	Static test LC50 - *Pimephales promelas* (fathead minnow) - 577 mg/l - 96 h
Toxicity to Daphnia	Static test LC50 - *Daphnia magna* (Water flea) - 206.8 mg/l - 48 h and other aquatic invertebrates
Toxicity to Bacteria	Respiration inhibition EC50 - Sludge Treatment - 820 mg/l - 3 h Method: OECD Test Guideline 209
Persistence and Degradability	No data available
Bioaccumulative Potential	No data available
Mobility in Soil	No data available
PBT and vPvB Assessment	No data available
Other Adverse Effects	No data available

13. DISPOSAL CONSIDERATIONS

Product	Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations.
Contaminated Packaging	Dispose of container and unused contents in accordance with federal, state and local requirements.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	None
Non-Hazardous for Transport	This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport	Non-hazardous for air transport.

Contact ISOFLEX for other transportation information.

15. REGULATORY INFORMATION

OSHA Hazards	Target Organ Effect, Irritant, Carcinogen
SARA 302 Components	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components	**T**he following components are subject to reporting levels established by SARA Title III, Section 313: *CAS No.* 1313-27-5 / *Revision Date* 2007-07-01.
SARA 311/312 Hazards	Acute Health Hazard, Chronic Health Hazard
Massachusetts Right to Know Components	*CAS No.* 1313-27-5 / *Revision Date* 2007-07-01

Pennsylvania Right to Know Components	*CAS No.* 1313-27-5 / *Revision Date* 2007-07-01
New Jersey Right to Know Components	*CAS No.* 1313-27-5 / *Revision Date* 2007-07-01
California Prop. 65 Components	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Prepared By	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Issuing Date	January 12, 2014
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Revision Number	4
Revision Note	Update supplier address

ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
ALARA	As Low As Is Reasonably Achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
EINECS	European Inventory of Existing Commercial Chemical Substances
EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health
IMDG	International Maritime Code for Dangerous Goods

LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration
MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährdungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

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