

**MATERION****1. Chemical and company identification**

Name of chemical (Product name) Silver Molybdenum Target

Supplier's company name, address and phone number

Company name Materion Advanced Materials

Address 6070 Parkland Boulevard
Mayfield Heights, OH 44124 United States

Contact person Theodore Knudson

Telephone EH&S 1.216.383.4019

e-mail address ehs@materion.com

Emergency telephone number See Section 16.

Reference number G53

2. Hazards identification**GHS classification**

The product is not classified according to GHS.

GHS label elements

Pictograms None.

Signal words None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Other hazards which do not result in classification None known.

Supplemental information For further information, please contact the Product Stewardship Department at +1.216.383.4019.

Main symptoms and emergency overview

Main symptoms Direct contact with eyes may cause temporary irritation.

Emergency overview The material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated.

3. Composition/information on ingredients

Substance or mixture Mixture

Chemical name or generic name	CAS Number	Gazette notification		Concentration (%)
		ENCS no.	ISHL no.	
Silver	7440-22-4			99
Molybdenum	7439-98-7			5

Chemical formula Ag (7440-22-4), Mo (7439-98-7)

4. First aid measures

If inhaled Move to fresh air. Call a physician if symptoms develop or persist.

If on skin Wash off with soap and water. Get medical attention if irritation develops and persists.

If in eyes Rinse with water. Get medical attention if irritation develops and persists.

If swallowed Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Protection of first-aid responders	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.
Notes to physician	Treat symptomatically.

5. Fire-fighting measures

Extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO ₂).
Extinguishing media to avoid	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards	None known.
Special fire fighting procedures	Move containers from fire area if you can do so without risk.
Protection of fire-fighters	Wear suitable protective equipment.
General fire hazards	No unusual fire or explosion hazards noted.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.
Methods and materials for containment and cleaning up	Stop the flow of material, if this is without risk. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.

7. Handling and storage

Handling

Technical measures (e.g. Local and general ventilation)	Provide adequate ventilation.
Safe handling advice	Avoid prolonged exposure. Observe good industrial hygiene practices.
Contact avoidance measures	Ammonia. Chlorine.
Hygiene measures	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Storage

Safe storage conditions	Store away from incompatible materials (see Section 10 of the SDS).
Safe packaging materials	Store in original tightly closed container.

8. Exposure controls/personal protection

Control parameters	Follow standard monitoring procedures.
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Occupational exposure limits

Japan. OELs - ISHL. (Workplace Environment Assessment Standards)

Components	Type	Value	Form
Molybdenum (CAS 7439-98-7)	TLV	0.025 mg/m ³	Dust.

Japan. OELs - JSOH (Japan Society of Occupational Health: Recommendation of Occupational Exposure Limits)

Components	Type	Value	Form
Molybdenum (CAS 7439-98-7)	TWA	8 mg/m ³	Total dust.
Silver (CAS 7440-22-4)	TWA	2 mg/m ³ 0.01 mg/m ³	Respirable dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Molybdenum (CAS 7439-98-7)	TWA	3 mg/m ³	Respirable fraction.
		10 mg/m ³	Inhalable fraction.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m ³	Dust and fume.

Engineering measures

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Hand protection	Wear protective gloves.
Eye protection	Wear safety glasses with side shields (or goggles).
Skin and body protection	Wear suitable protective clothing.

9. Physical and chemical properties

Physical state	Solid.
Form	Solid.
Color	Silver.
Odor	None.
Odor threshold	Not applicable.
Melting point/freezing point	1760.9 °F (960.5 °C) estimated / Not applicable.
Boiling point, initial boiling point, and boiling range	Not applicable.
Combustibility	None known.
Lower and upper explosion limit / flammability limit	
Flammability limit - lower (%)	Not applicable.
Flammability limit - lower (%) temperature	Not applicable.
Flammability limit - upper (%)	Not applicable.
Flammability limit - upper (%) temperature	Not applicable.
Explosive limit - lower (%)	Not applicable.
Explosive limit - lower (%) temperature	Not applicable.
Explosive limit - upper (%)	Not applicable.
Explosive limit - upper (%) temperature	Not applicable.
Flash point	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not applicable.
pH	Not applicable.
Kinematic viscosity	Not available.
Solubility(ies)	
Solubility (water)	Insoluble.
Partition coefficient (n-octanol/water) (log value)	Not applicable.
Vapor pressure	Not applicable.

Density and/or relative density	
Density	10.48 g/cm ³ estimated
Relative density	Not applicable.
Vapor density	Not applicable.
Particle characteristics	Not available.
Other information	
Evaporation rate	Not applicable.
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Specific gravity	10.48 estimated
Viscosity (Coefficient of viscosity)	Not applicable.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Ammonia. Chlorine.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Acute toxicity	None known.
Skin corrosion/irritation	This product is not expected to cause skin sensitization.
Serious eye damage/eye irritation	May cause temporary eye irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	Not a skin sensitizer.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.
Reproductive toxicity	Not classified.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicological data

Product	Species		Test Results
Silver Molybdenum Target			
Aquatic			
<i>Acute</i>			
Crustacea	EC50	Daphnia	0.0096 mg/l, 48 hours estimated
Fish	LC50	Fish	0.0023 mg/l, 96 hours estimated

Components	Species	Test Results
Silver (CAS 7440-22-4)		
Aquatic		
<i>Acute</i>		
Fish	LC50	Fathead minnow (<i>Pimephales promelas</i>) 0.0019 - 0.003 mg/l, 96 hours
Ecotoxicity		The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability		No data is available on the degradability of any ingredients in the mixture.
Bioaccumulation		No data available.
Mobility in soil		No data available for this product.
Hazardous to the ozone layer		No data available.
Other hazardous effects		No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Residual waste	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
Local disposal regulations	Contract with a disposal operator licensed by the Law on Disposal and Cleaning. When your own wastewater treatment plant is not available, collect entire waste and then charge to a licensed industrial waste management professional with manifests for industrial waste.

14. Transport information

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

National regulations Follow regulation in section 15 for domestic transportation.

15. Regulatory information

Industrial Safety and Health Act

Notifiable substances

MOLYBDENUM AND MOLYBDENUM COMPOUNDS	Table 9 Ordinance No. 603	1.0 - 5.0 %
SILVER AND SILVER COMPOUNDS, WATER-SOLUBLE	Table 9 Ordinance No. 137	95 - 99 %

Labeling substances

MOLYBDENUM (POWDER)		1.0 - 5.0 %
MOLYBDENUM AND MOLYBDENUM COMPOUNDS		1.0 - 5.0 %
SILVER (POWDER)		95 - 99 %
SILVER AND SILVER COMPOUNDS, WATER-SOLUBLE		95 - 99 %

Poisonous and Deleterious Substances Control Act

Specified poisonous substances

Not regulated.

Poisonous substances

Not regulated.

Deleterious substances

Not regulated.

Act on the Regulation of Manufacture and Evaluation of Chemical Substances

Class I specified chemical substances

Not regulated.

Class II specified chemical substances

Not regulated.

Monitoring chemical substances

Not regulated.

Priority Assessment Chemical Substances (PACs)

Not regulated.

Reporting Exempted Substances

Not regulated.

Law concerning Pollutant Release and Transfer Register**Specified class 1 substances (substance name, ordinance number and content)**

Not regulated.

Class 1 substances (substance name, ordinance number and content)

MOLYBDENUM AND ITS COMPOUNDS (AS Ordinance No. 453 5.0 % (Molybdenum)
MO)

SILVER AND ITS WATER-SOLUBLE Ordinance No. 82 99 % (Silver)
COMPOUNDS (AS AG)

Class 2 substances (substance name, ordinance number and content)

Not regulated.

Ship Safety Law, Dangerous Goods Marine Transport and Storage Rule

Not regulated.

Air Law, Enforcement Rule

Not regulated.

Explosives Control Act

Not regulated.

16. Other information**Bibliography**

ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
Japan Society for Occupational Health, Recommendation of Occupational Exposure Limits
Japan Chemical Industry Association (JCIA) GHS Guideline, June 2012
JIS Z 7252:2014 Classification of chemicals based on "Globally Harmonized System of Classification and Labelling of Chemicals (GHS)"
JIS Z 7253:2012 Hazard communication of chemicals based on GHS - Labelling and Safety Data Sheet (SDS)

Further information

Transportation Emergency
Call Chemtrec at:
International: 703.741.5970
Spain: 900.868.538
Switzerland: 0800.564.402
Chemtrec's toll free, mobile-enabled number in Germany – 0800 1817059

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Other information

Revised information in Section 16.