



# MATERIAL SAFETY DATA SHEET

**MATERION**

## 1. Chemical product and company identification

**A. Product name** Silver Molybdenum Target

**Other means of identification**

SDS number G53

**B. Recommended use and Limitations on use**

**Recommended use** Manufacture of computer, electronic and optical products, electrical equipment  
Scientific research and development  
Other: Manufacture of medical and defense equipment

**Limitations on use** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)  
Consumer uses: Private households (= general public = consumers)

**C. Supplier information**

**Company name** Materion Advanced Materials  
**Address** 6070 Parkland Boulevard  
Mayfield Heights OH 44124  
United States

**Telephone** EH&S 1.216.383.4019

**Email** ehs@materion.com

**Contact person** Theodore Knudson

**Emergency telephone number** See Section 16.

**Importer**

**Company name** See above.

**MSDS number** G53

## 2. Hazards identification

**A. Hazard category/Classification**

**Physical hazards** Not classified.

**Health hazards** Not classified.

**Environmental hazards** Not classified.

**B. Warning label items including precautionary statement**

• **Pictogram** None.

• **Signal word** 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.

**C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard)** None known.

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

## 3. Composition/information on ingredients

Chemical identity	Common and alternative names	CAS number	ID number	Content in percent (%)
Silver		7440-22-4	KE-31261	95 - 99

Chemical identity	Common and alternative names	CAS number	ID number	Content in percent (%)
Molybdenum		7439-98-7	KE-25427	1 - 5

#### 4. First aid measures

<b>A. In case of eye contact</b>	Rinse with water. Get medical attention if irritation develops and persists.
<b>B. In case of skin contact</b>	Wash off with soap and water. Get medical attention if irritation develops and persists.
<b>C. In case of inhalation</b>	Move to fresh air. Call a physician if symptoms develop or persist.
<b>D. In case of swallowing</b>	Rinse mouth. Get medical attention if symptoms occur.
<b>E. Note to physician</b>	Treat symptomatically.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>General advice</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

#### 5. Fire-fighting measures

<b>A. Suitable (and unsuitable) extinguishing media</b>	
<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>B. Specific hazards arising from the chemical (example: hazardous combustion products)</b>	None known.
<b>C. Specific methods of fire-fighting</b>	
<b>Special protective equipment for firefighters</b>	Wear suitable protective equipment.
<b>Special fire fighting procedures</b>	Move containers from fire area if you can do so without risk.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.

#### 6. Accidental release measures

<b>A. Personal precautions, protective equipment and emergency measures</b>	Keep unnecessary personnel away. For personal protection, see section 8 of the MSDS.
<b>B. Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.
<b>C. Methods and materials for containment and cleaning up</b>	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 MSDS.

#### 7. Handling and storage

<b>A. Precautions for safe handling</b>	Avoid prolonged exposure. Observe good industrial hygiene practices.
<b>B. Conditions for safe storage (including any incompatibilities)</b>	Store in tightly closed container. Store away from incompatible materials (see Section 10 of the MSDS).

#### 8. Exposure controls/personal protection

##### A. Exposure limit values, biological limit values, etc

###### Korea. OELs. Standards for Exposure to Chemical Substances and Physically Hazardous Factors

Components	Type	Value	Form
Molybdenum (CAS 7439-98-7)	TWA	5 mg/m <sup>3</sup>	Respirable fraction.
		10 mg/m <sup>3</sup>	Inhalable fraction.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	Dust and fume.

## US. ACGIH Threshold Limit Values

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

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### B. Appropriate engineering controls

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.

### C. Personal protective equipment

- Respiratory protection Not available.
- Eye protection Not available.
- Hand protection Wear protective gloves.
- Body protection Wear suitable protective clothing.

### 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.

## 9. Physical and chemical properties

### A. Appearance

- Physical state Solid.
- Form Solid.
- Color Silver.

B. Odor None.

C. Odor threshold Not applicable.

D. pH Not applicable.

### E. Melting point/freezing point

- Melting point 1760.9 °F (960.5 °C) estimated
- Freezing point Not applicable.

F. Boiling point, initial boiling point, and boiling range Not applicable.

G. Flash point Not applicable.

H. Evaporation rate Not applicable.

I. Flammability (solid, gas) None known.

### J. Upper/lower limit on flammability or explosive limits

- 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.

K. Vapor pressure Not applicable.

<b>L. Solubility</b>	
Solubility (water)	Insoluble.
<b>M. Vapor density</b>	Not applicable.
<b>N. Specific gravity</b>	10.48 estimated
<b>O. n-octanol/water partition coefficient</b>	Not applicable.
<b>P. Auto-ignition temperature</b>	Not applicable.
<b>Q. Decomposition temperature</b>	Not applicable.
<b>R. Viscosity</b>	Not applicable.
<b>S. Molecular weight</b>	Not available.
<b>Other data</b>	
Density	10.48 g/cm <sup>3</sup> estimated
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Relative density	Not applicable.

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>A. Stability and hazardous reaction potential</b>	
Stability	Material is stable under normal conditions.
Hazardous reaction potential	No dangerous reaction known under conditions of normal use.
<b>B. Conditions to avoid (e.g. static discharge, shock or vibration, etc)</b>	Contact with incompatible materials.
<b>C. Incompatible materials</b>	Ammonia. Chlorine.
<b>D. Hazardous decomposition products</b>	No hazardous decomposition products are known.

## 11. Toxicological information

<b>A. Information on likely routes of exposure</b>	
• Respiratory organs	Prolonged inhalation may be harmful.
• Skin	No adverse effects due to skin contact are expected.
• Eyes	Direct contact with eyes may cause temporary irritation.
• Mouth	Expected to be a low ingestion hazard.
<b>B. Information on health hazards</b>	
• Acute toxicity (list all possible routes of exposure)	None known.
• Corrosivity or irritation to the skin	This product is not expected to cause skin sensitization.
• Serious eye damage/eye irritation	May cause temporary eye irritation.
• Respiratory sensitization	Not a respiratory sensitizer.
• Skin sensitization	Not a skin sensitizer.
• Carcinogenic properties /Carcinogenicity	Not classified.
• Mutagenic properties /Mutagenicity	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

### A. 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.

Product	Species	Test Results
Silver Molybdenum Target		
<b>Aquatic</b>		
<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)		
<b>Aquatic</b>		
<i>Acute</i>		
Fish	LC50 Fathead minnow (Pimephales promelas)	0.0019 - 0.003 mg/l, 96 hours

### Hazardous to the aquatic environment, acute hazard

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.

### B. Persistence/degradability

No data is available on the degradability of any ingredients in the mixture.

### C. Bioaccumulative potential

No data available.

### D. Mobility in soil

No data available for this product.

### E. Other adverse 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

### A. Method of disposal

Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

### B. Disposal considerations (including disposal of contaminated containers or 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.

### Waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

## 14. Transport information

### IATA

- A. UN number Not applicable.
- B. UN proper shipping name Not applicable.
- C. Transport hazard class(es)
  - Class Not applicable.
  - Subsidiary risk -
- D. Packing group Not applicable.
- E. Environmental hazards No.
- F. Special precautions for user Not applicable.

### IMDG

- A. UN number Not applicable.
- B. UN proper shipping name Not applicable.
- C. Transport hazard class(es)
  - Class Not applicable.
  - Subsidiary risk -
- D. Packing group Not applicable.
- E. Environmental hazards
  - Marine pollutant No.

EmS	Not applicable.
F. Special precautions for user	Not applicable.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

## 15. Regulatory information

### A. Restrictions under the Industrial Safety and Health Law

#### Harmful Substances Prohibited from Manufacturing

Not regulated.

#### Harmful Substances Requiring Permission for Manufacture or Use

Not regulated.

#### Controlled Hazardous Substances

Silver (CAS 7440-22-4)

#### Harmful Substances Requiring Special Medical Examination

Not regulated.

#### Workplace Environmental Monitoring Harmful Materials

Silver (CAS 7440-22-4)

#### Occupational Exposure Limit

Molybdenum (CAS 7439-98-7)

Silver (CAS 7440-22-4)

### B. Restrictions under the Chemicals Control Law (Previously Toxic Chemicals Control Law)

#### Accidental Release Prevention Substances

Not regulated.

#### Act on the Registration and Evaluation of Chemicals

##### Banned Toxic Chemicals

Not regulated.

##### Designated Existing Chemicals Subject to Registration (PEC) (MoE No. 2015-92)

Not listed.

##### Restricted Chemical Substances

Not regulated.

##### Toxic Chemicals

Not regulated.

### C. Restrictions under the Dangerous Substance Safety Management Act

### D. Restrictions under the Wastes Control Act

#### Halogenated Materials in Waste Organic Solvents

Not regulated.

#### Hazardous Substances

Not regulated.

### E. Restrictions under other foreign or domestic laws

#### Clean Air Conservation Act

##### Air Pollutants

Not regulated.

##### Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides (Rules on PIC, MoE No. 2014-252, Dec. 31, 2014; Standards for Pesticides, RDA No. 2014-26), as amended

Not listed.

##### Specific Air Pollutants

Not regulated.

### Further information

This material safety data sheet was prepared in accordance with Article 41 of the Industrial Safety and Health Law.

## Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## 16. Other information

### A. Source of information

ACGIH  
EPA: ACQUIRE database  
NLM: Hazardous Substances Data Base  
US. IARC Monographs on Occupational Exposures to Chemical Agents  
Korea. Accidental Release Prevention Substances (Presidential Decree of Toxic Chemical Control Law, Executive Order No. 19203)  
Korea. Dangerous Substances Threshold Quantity (Presidential Decree of Dangerous Substances Safety Management Act No. 18406, Schedule 1)  
Korea. Harmful Substances Prohibited from Manufacturing (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 29)  
Korea. Harmful Substances Requiring Permission for Manufacture or Use (Presidential Decree on the Industrial Safety and Health Act (No. 13053), Article 30)  
Korea. OELs. Regulation for Permitted Concentration of Hazardous Substances (Ministry of Labor (MOL) Public Notice No. 1986-45, as amended)  
Korea. Prohibited Chemical Substances (TCCL Article 11)  
Korea. Regulated volatile organic compounds (VOCs) (MOE Notice No. 2001-36, March 8, 2001, as amended)  
Korea. Restricted Chemical Substances (TCCL Article 11)  
Korea. Toxic Chemical Control Law (TCCL), Existing Chemicals Inventory (KECI)  
Korea. Toxic Chemical Control Law (TCCL), pre-1997 List  
Korea. Toxic Chemicals (TCCL Article 10)  
Korea. Toxic Release Inventory (TRI) Chemicals (TCCL Article 14)  
Korea. Accidental Release Prevention Substances (Pres. Decree of Toxic Chemical Control Law, Ex. Order No. 19203, Tables 2 & 3, Dec 28, 2005)  
Korea. OELs (ISHL Article 42; MOL Public Notice No. 1986-45, as amended through MOEL Notice 2013-38, August 14, 2013)  
Korea. Prohibited Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 4 and 5)  
Korea. Restricted Chemical Substances (AREC "K-REACH" Article 27; Designation of Toxic, Restricted or Banned Chemicals Appendices 2 and 3)  
KECI, January 27, 2015, amended through MoE 2016-138, July 13, 2016  
Korea. Toxic Chemicals (AREC "K-REACH" Article 20; Designation of Toxic, Restricted or Banned Chemicals Appendix 1)  
Korea. Toxic Release Inventory (TRI) Chemicals (MOE Public Notice No. 2002-166, Nov. 8, 2002)

### B. Issue date

08-30-2019

### C. Number of revisions and date of most recent revision

09-21-2021 (02 revision)

### 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  
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

**Disclaimer**

This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws, statutes and regulations.

**Other information**

Revised information in Section 16.