



# 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 Germany GmbH

**Address** Borsigstrasse 10  
Alzenau 63755  
Germany

**Email** Materion.Germany@materion.com

**Contact person** Hermann Schmiing

**Emergency telephone number** 49.60.23.91.82.0

**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
Molybdenum		7439-98-7	KE-25427	1 - 5

#### 4. First aid measures

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

#### 5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media	
Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
B. Specific hazards arising from the chemical (example: hazardous combustion products)	None known.
C. Specific methods of fire-fighting	
Special protective equipment for firefighters	Wear suitable protective equipment.
Special fire fighting procedures	Move containers from fire area if you can do so without risk.
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

A. Personal precautions, protective equipment and emergency measures	Keep unnecessary personnel away. For personal protection, see section 8 of the MSDS.
B. Environmental precautions	Avoid discharge into drains, water courses or onto the ground.
C. 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 MSDS.

#### 7. Handling and storage

A. Precautions for safe handling	Avoid prolonged exposure. Observe good industrial hygiene practices.
B. Conditions for safe storage (including any incompatibilities)	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.

**US. ACGIH Threshold Limit Values**

Components	Type	Value	Form
Silver (CAS 7440-22-4)	TWA	10 mg/m3 0.1 mg/m3	Inhalable fraction. Dust and fume.
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).		
<b>B. Appropriate engineering controls</b>	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.		
<b>C. Personal protective equipment</b>	<ul style="list-style-type: none"> <li>• <b>Respiratory protection</b> In case of insufficient ventilation, wear suitable respiratory equipment.</li> <li>• <b>Eye protection</b> Wear safety glasses with side shields (or goggles).</li> <li>• <b>Hand protection</b> Wear protective gloves.</li> <li>• <b>Body protection</b> Wear suitable protective clothing.</li> </ul>		
<b>Hygiene measures</b>	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.		
<b>9. Physical and chemical properties</b>			
<b>A. Appearance</b>	<ul style="list-style-type: none"> <li><b>Physical state</b> Solid.</li> <li><b>Form</b> Solid.</li> <li><b>Color</b> Silver.</li> </ul>		
<b>B. Odor</b>	None.		
<b>C. Odor threshold</b>	Not applicable.		
<b>D. pH</b>	Not applicable.		
<b>E. Melting point/freezing point</b>	<ul style="list-style-type: none"> <li><b>Melting point</b> 1760.9 °F (960.5 °C) estimated</li> <li><b>Freezing point</b> Not applicable.</li> </ul>		
<b>F. Boiling point, initial boiling point, and boiling range</b>	Not applicable.		
<b>G. Flash point</b>	Not applicable.		
<b>H. Evaporation rate</b>	Not applicable.		
<b>I. Flammability (solid, gas)</b>	None known.		
<b>J. Upper/lower limit on flammability or explosive limits</b>	<ul style="list-style-type: none"> <li><b>Flammability limit - lower (%)</b> Not applicable.</li> <li><b>Flammability limit - lower (%) temperature</b> Not applicable.</li> <li><b>Flammability limit - upper (%)</b> Not applicable.</li> <li><b>Flammability limit - upper (%) temperature</b> Not applicable.</li> <li><b>Explosive limit - lower (%)</b> Not applicable.</li> <li><b>Explosive limit - lower (%) temperature</b> Not applicable.</li> <li><b>Explosive limit - upper (%)</b> Not applicable.</li> <li><b>Explosive limit - upper (%) temperature</b> Not applicable.</li> </ul>		
<b>K. Vapor pressure</b>	Not applicable.		
<b>L. Solubility</b>	<ul style="list-style-type: none"> <li><b>Solubility (water)</b> Insoluble.</li> </ul>		

M. Vapor density	Not applicable.
N. Specific gravity	10.48 estimated
O. n-octanol/water partition coefficient	Not applicable.
P. Auto-ignition temperature	Not applicable.
Q. Decomposition temperature	Not applicable.
R. Viscosity	Not applicable.
S. Molecular weight	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>	
<b>Stability</b>	Material is stable under normal conditions.
<b>Hazardous reaction potential</b>	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>	
• <b>Respiratory organs</b>	Prolonged inhalation may be harmful.
• <b>Skin</b>	No adverse effects due to skin contact are expected.
• <b>Eyes</b>	Direct contact with eyes may cause temporary irritation.
• <b>Mouth</b>	Expected to be a low ingestion hazard.
<b>B. Information on health hazards</b>	
• <b>Acute toxicity (list all possible routes of exposure)</b>	None known.
• <b>Corrosivity or irritation to the skin</b>	This product is not expected to cause skin sensitization.
• <b>Serious eye damage/eye irritation</b>	May cause temporary eye irritation.
• <b>Respiratory sensitization</b>	Not a respiratory sensitizer.
• <b>Skin sensitization</b>	Not a skin sensitizer.
• <b>Carcinogenic properties /Carcinogenicity</b>	Not classified.
• <b>Mutagenic properties /Mutagenicity</b>	Not classified.
• <b>Reproductive toxicity</b>	Not classified.
• <b>Specific target organ toxicity - single exposure</b>	Not classified.
• <b>Specific target organ toxicity - repeated exposure</b>	Not classified.
• <b>Aspiration hazard</b>	Not an aspiration hazard.

## 12. Ecological information

<b>A. Ecotoxicity</b>	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>Hazardous to the aquatic environment, acute hazard</b>	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>B. Persistence/degradability</b>	No data is available on the degradability of any ingredients in the mixture.
<b>C. Bioaccumulative potential</b>	No data available.
<b>D. Mobility in soil</b>	No data available for this product.
<b>E. Other adverse effects</b>	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

<b>A. Method of disposal</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
<b>B. Disposal considerations (including disposal of contaminated containers or packaging)</b>	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.
<b>Waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

## 14. Transport information

<b>IATA</b>	
<b>A. UN number</b>	Not applicable.
<b>B. UN proper shipping name</b>	Not applicable.
<b>C. Transport hazard class(es)</b>	
Class	Not applicable.
Subsidiary risk	-
<b>D. Packing group</b>	Not applicable.
<b>E. Environmental hazards</b>	No.
<b>F. Special precautions for user</b>	Not applicable.
<b>IMDG</b>	
<b>A. UN number</b>	Not applicable.
<b>B. UN proper shipping name</b>	Not applicable.
<b>C. Transport hazard class(es)</b>	
Class	Not applicable.
Subsidiary risk	-
<b>D. Packing group</b>	Not applicable.
<b>E. Environmental hazards</b>	
Marine pollutant	No.
EmS	Not applicable.
<b>F. Special precautions for user</b>	Not applicable.
<b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable.

## 15. Regulatory information

<b>A. Restrictions under the Industrial Safety and Health Law</b>
<b>Harmful Substances Prohibited from Manufacturing</b>
Not regulated.
<b>Harmful Substances Requiring Permission for Manufacture or Use</b>
Not regulated.
<b>Controlled Hazardous Substances</b>
Silver (CAS 7440-22-4)
<b>Harmful Substances Requiring Special Medical Examination</b>
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

### Bibliography

ACGIH  
EPA: AQUIRE 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)

### Further information

Transportation Emergency  
Call Chemtrec at:  
Domestic: 800.424.9300  
International: 703.527.3887

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