



SAFETY DATA SHEET

MATERION

1. Product and company identification

| | | |
|--|--|----------------|
| Name of the chemical | Silver Molybdenum Target | |
| Other means of identification | | |
| SDS number | G53 | |
| Recommended use of the chemical and restrictions on use | | |
| Recommended use | Manufacture of computer, electronic and optical products, electrical equipment Scientific research and development Other: Manufacture of medical and defense equipment | |
| Recommended restrictions | Professional uses: Public domain (administration, education, entertainment, services, craftsmen) Consumer uses: Private households (= general public = consumers) | |
| Manufacturer/Importer/Supplier/ Distributor information | Materion Advanced Materials | |
| Address | 6070 Parkland Boulevard Mayfield Heights OH 44124 United States | |
| Telephone | EH&S | 1.216.383.4019 |
| E-mail | ehs@materion.com | |
| Contact person | Theodore Knudson | |
| Emergency telephone number | See Section 16. | |

2. Hazards identification

| | | |
|--------------------------|--|--|
| Hazard classification | | |
| Physical hazards | Not classified. | |
| Health hazards | Not classified. | |
| Environmental hazards | Not classified. | |
| Label elements | | |
| Symbols | 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. | |
| Other hazards | None known. | |
| Supplemental information | For further information, please contact the Product Stewardship Department at +1.216.383.4019. | |

3. Composition/information on ingredients

| | | |
|---------------------|------------|-------------------|
| Mixture | | |
| Chemical properties | CAS Number | Concentration (%) |
| Silver | 7440-22-4 | 95 - 99 |
| Molybdenum | 7439-98-7 | 1 - 5 |

4. First aid measures

| | | |
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| First aid measures for different exposure routes | | |
| Inhalation | Move to fresh air. Call a physician if symptoms develop or persist. | |
| Skin contact | Wash off with soap and water. Get medical attention if irritation develops and persists. | |

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|---|--|
| Eye contact | Rinse with water. Get medical attention if irritation develops and persists. |
| Ingestion | Rinse mouth. Get medical attention if symptoms occur. |
| Most important symptoms and effects | Direct contact with eyes may cause temporary irritation. |
| Personal protection for 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 (CO2). |
| Extinguishing media to avoid | Do not use water jet as an extinguisher, as this will spread the fire. |
| Specific hazards during fire fighting | 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 | 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. |
| Spill cleanup methods | 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

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| Handling | Avoid prolonged exposure. Observe good industrial hygiene practices. |
| Storage | Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). |

8. Exposure controls/personal protection

Exposure limits

OELs. (Standards on Workplace Atmosphere of Dangerous and Hazardous Materials)

| Components | Type | Value | Form |
|------------------------|------|------------|----------------|
| Silver (CAS 7440-22-4) | STEL | 0.03 mg/m3 | Dust and fume. |
| | TWA | 0.01 mg/m3 | Dust and fume. |

US. ACGIH Threshold Limit Values

| Components | Type | Value | Form |
|----------------------------|------|-----------|----------------------|
| Molybdenum (CAS 7439-98-7) | TWA | 3 mg/m3 | Respirable fraction. |
| | | 10 mg/m3 | Inhalable fraction. |
| Silver (CAS 7440-22-4) | TWA | 0.1 mg/m3 | Dust and fume. |

| | |
|--|---|
| Biological limit values | No biological exposure limits noted for the ingredient(s). |
| 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. |
| Individual protection measures, such as personal protective equipment | |
| Eye/face protection | Wear safety glasses with side shields (or goggles). |
| Skin protection | |
| Hand protection | Wear protective gloves. |
| Other | Wear suitable protective clothing. |
| Respiratory protection | In case of insufficient ventilation, wear suitable respiratory equipment. |
| Thermal hazards | Wear appropriate thermal protective clothing, when necessary. |

General hygiene considerations 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

Appearance

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.

pH Not applicable.

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

Flammability (solid, gas) None known.

Flash point Not applicable.

Decomposition temperature Not applicable.

Auto-ignition temperature Not applicable.

Upper/lower 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.

Vapor pressure Not applicable.

Vapor density Not applicable.

Density 10.48 g/cm³ estimated

Solubility(ies)

Solubility (water) Insoluble.

Partition coefficient (n-octanol/water) Not applicable.

Evaporation rate Not applicable.

Other data

Explosive properties Not explosive.

Oxidizing properties Not oxidizing.

Relative density Not applicable.

Specific gravity 10.48 estimated

Viscosity Not applicable.

10. Stability and reactivity

Reactivity The product is stable and non-reactive under normal conditions of use, storage and transport.

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

Information on likely routes of exposure

| | |
|---------------------|--|
| Inhalation | Prolonged inhalation may be harmful. |
| Skin contact | No adverse effects due to skin contact are expected. |
| Eye contact | Direct contact with eyes may cause temporary irritation. |
| Ingestion | Expected to be a low ingestion hazard. |

Symptoms Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

| | |
|---|---|
| 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. |
| Chronic effects | None known. |

12. Ecological information

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 | | |
| Aquatic | | |
| <i>Acute</i> | | |
| Crustacea | EC50 | Daphnia |
| Fish | LC50 | Fish |
| | | 0.0096 mg/l, 48 hours estimated |
| | | 0.0023 mg/l, 96 hours estimated |
| Components | Species | Test Results |

| | | | |
|------------------------|------|--------------------------------------|-------------------------------|
| Silver (CAS 7440-22-4) | | | |
| Aquatic | | | |
| <i>Acute</i> | | | |
| Fish | LC50 | Fathead minnow (Pimephales promelas) | 0.0019 - 0.003 mg/l, 96 hours |

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|--------------------------------------|---|
| 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. |
| 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

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|-----------------------------------|--|
| Disposal instructions | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. |
| 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 | Dispose in accordance with all applicable regulations. |

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.

15. Regulatory information

Applicable regulations Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste
Regulations for the Labeling and Hazard Communication of Hazardous Chemicals
Toxic Chemical Substances Control Act
Toxic Chemical Substances Labeling and Materials Safety Data Sheets Regulations
This material safety data sheet was prepared in accordance with the Regulation of Labeling and Hazard Communication of Hazardous Chemicals.

Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste

Not listed.

Priority Management Chemical List (Regulations on Handling Priority Managed Chemicals), as amended

Not listed.

Toxic Chemical Substances (TCS) List (EPA Toxic Substances Notice No. 0960095331E, Tables 1-3, Dec. 17, 2007, as amended)

Not listed.

Standards on Workplace Atmosphere of Dangerous and Hazardous Materials

Silver (CAS 7440-22-4) Listed.

GHS Classification List: GHS implementation phase 1, 2 and 3 (CLA No. 0980145063, 0990146707, and 1020146801)

Molybdenum (CAS 7439-98-7)

Silver (CAS 7440-22-4)

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Montreal Protocol

Not applicable.

Kyoto protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|----------------------|--|------------------------|
| Australia | Australian Inventory of Chemical Substances (AICS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|-----------------------------|--|------------------------|
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | No |
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| Taiwan | Taiwan Chemical Substance Inventory (TCSI) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | 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

References

ACGIH
 EPA: ACQUIRE database
 NLM: Hazardous Substances Data Base
 US. IARC Monographs on Occupational Exposures to Chemical Agents
 Taiwan. Dangerous Materials (Rules on Hazard Communication of Dangerous Materials and Toxic Materials)
 Taiwan. Industrial Precursor Chemicals (Categories and Regulations Governing Inspection and Declaration of Industrial Precursor Chemicals, MOEA Decree No. 87, as amended)
 Taiwan. OELs. (Standards on Workplace Atmosphere of Dangerous and Hazardous Materials)
 Taiwan. Toxic Chemical Substances (TCS) (List of Toxic Chemical Substances announced by the Environmental Protection Administration)
 Taiwan. Toxic Materials (Rules on Hazard Communication of Dangerous Materials and Toxic Materials)

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Prepared by

Not available.