



MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name	Metallic Silver	
Other means of identification		
SDS number	Q04	
B. Recommended use and Limitations on use		
Recommended use	Not available.	
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	Q04	

2. Hazards identification

A. Hazard category/Classification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Specific target organ toxicity, single exposure	Category 1
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1

B. Warning label items including precautionary statement

• Pictogram



• Signal word

Danger

• Hazard statement

H317	May cause an allergic skin reaction.
H370	Causes damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

• Precautionary statement

Prevention

P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

P302 + P350 If on skin: Wash with plenty of water.
P308 + P311 If exposed or concerned: Call a poison center/doctor/.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P391 Collect spillage.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container (in accordance with related regulations).

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	100

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 Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.
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 Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
Most important symptoms/effects, acute and delayed May cause an allergic skin reaction. Prolonged exposure may cause chronic effects.
General advice If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media
Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).
Unsuitable extinguishing media Water.
B. Specific hazards arising from the chemical (example: hazardous combustion products) This product is not flammable.
C. Specific methods of fire-fighting
Special protective equipment for firefighters Wear suitable protective equipment.
Special fire fighting procedures Use water spray to cool unopened containers.
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. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the MSDS.
- B. Environmental precautions** Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
- C. Methods and materials for containment and cleaning up** The product is immiscible with water and will spread on the water surface. Prevent product from entering drains. 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 breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.
- B. Conditions for safe storage (including any incompatibilities)** Store locked up.

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
Silver (CAS 7440-22-4)	TWA	0.1 mg/m ³	Dust and fume.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Silver (CAS 7440-22-4)	TWA	0.1 mg/m ³	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** If contact is likely, safety glasses with side shields are recommended.
- **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. Contaminated work clothing should not be allowed out of the workplace.

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)
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.
L. Solubility	
Solubility (water)	Insoluble
M. Vapor density	Not applicable.
N. Specific gravity	Not applicable.
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	107.86 g/mol

Other data

Density	10.49 g/cm ³ estimated at 15 °C
Explosive limit	Not applicable.
Explosive properties	Not explosive.
Explosivity	Not applicable.
Flammability	Not flammable.
Molecular formula	Ag
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
A. Stability and hazardous reaction potential	
Stability	Material is stable under normal conditions.
Hazardous reaction potential	No dangerous reaction known under conditions of normal use.
B. Conditions to avoid (e.g. static discharge, shock or vibration, etc)	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
C. Incompatible materials	Ammonia. Chlorine.
D. Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure

- **Respiratory organs** Prolonged inhalation may be harmful.
- **Skin** May cause an allergic skin reaction.
- **Eyes** Direct contact with eyes may cause temporary irritation.
- **Mouth** Expected to be a low ingestion hazard.

B. Information on health hazards

- **Acute toxicity (list all possible routes of exposure)** Not known.
- **Corrosivity or irritation to the skin** Prolonged skin contact may cause temporary irritation.
- **Serious eye damage/eye irritation** Direct contact with eyes may cause temporary irritation.
- **Respiratory sensitization** Not a respiratory sensitizer.
- **Skin sensitization** May cause an allergic skin reaction.
- **Carcinogenic properties /Carcinogenicity** Not classified.
- **Mutagenic properties /Mutagenicity** Not classified.
- **Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.
- **Specific target organ toxicity - single exposure** Causes damage to organs.
- **Specific target organ toxicity - repeated exposure** Causes damage to organs through prolonged or repeated exposure.
- **Aspiration hazard** Not an aspiration hazard.

12. Ecological information

A. Ecotoxicity Very toxic to aquatic life with long lasting effects.

Product	Species	Test Results
Metallic Silver		
Aquatic		
<i>Acute</i>		
Crustacea	EC50 Water flea (<i>Daphnia magna</i>)	0.0002 mg/l, 48 hours
Fish	LC50 Fathead minnow (<i>Pimephales promelas</i>)	0.0019 - 0.003 mg/l, 96 hours
Hazardous to the aquatic environment, acute hazard	Very toxic to aquatic life.	
Hazardous to the aquatic environment, long-term hazard	Very toxic to aquatic life with long lasting effects.	

B. Persistence/degradability No data is available on the degradability of this substance.

C. Bioaccumulative potential No data available.

D. Mobility in soil The product is immiscible with water and will spread on the water surface.

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. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container (in accordance with related regulations).

**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

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: 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)

B. Issue date

09-04-2019

C. Number of revisions and date of most recent revision

09-27-2021 (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

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