



MATERIAL SAFETY DATA SHEET

MATERION

1. Chemical product and company identification

A. Product name Copper Gallium with Sodium Selenite

Other means of identification

SDS number G14

B. Recommended use and Limitations on use

Recommended use Industrial uses: Uses of substances as such or in preparations at industrial sites

Limitations on use Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

C. Supplier information

Company name Materion Advanced Materials Germany GmbH

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MSDS number G14

2. Hazards identification

A. Hazard category/Classification

Physical hazards Corrosive to metals Category 1

Health hazards Acute toxicity, oral Category 2

Acute toxicity, inhalation Category 3

Serious eye damage/eye irritation Category 1

Sensitization, skin Category 1

Environmental hazards Hazardous to the aquatic environment, long-term hazard Category 2

B. Warning label items including precautionary statement

• **Pictogram**



• **Signal word** Danger

• **Hazard statement**

- H290 May be corrosive to metals.
- H300 Fatal if swallowed.
- H317 May cause an allergic skin reaction.
- H318 Causes serious eye damage.
- H331 Toxic if inhaled.
- H411 Toxic to aquatic life with long lasting effects.

• **Precautionary statement**

Prevention

- P234 Keep only in original container.
- P260 Do not breathe dust/fume/gas/mist/vapors/spray.
- P261 Avoid breathing dust.
- P264 Wash thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- 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.
 P284 Wear respiratory protection.

Response

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 P301 + P330 + P310 IF SWALLOWED: Rinse mouth. Immediately obtain medical assistance.
 P330 Rinse mouth.
 P302 + P352 IF ON SKIN: Wash with plenty of water.
 P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately get medical assistance.
 P305 + P351 + P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P310 Immediately call a POISON CENTER or doctor/physician.
 P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
 P337 + P313 If eye irritation persists: Get medical advice/attention.
 P362 + P364 Take off contaminated clothing and wash it before reuse.
 P390 Absorb spillage to prevent material damage.

Storage

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
 P405 Store locked up.
 P406 Store in corrosive resistant container with a resistant inner liner.

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 (%)
Copper		7440-50-8	KE-08896	75 - 90
Gallium		7440-55-3	KE-17424	10 - 20
Sodium Selenite (Na ₂ SeO ₃)		10102-18-8	KE-31605	5 - 10
DISODIUM SELENITE * DISODIUM SELENIUM TRIOXIDE				

4. First aid measures

- A. In case of eye contact** Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
- 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. Wash contaminated clothing before reuse.
- C. In case of inhalation** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a poison center or doctor/physician.
- D. In case of swallowing** Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- E. Note to physician** Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

Most important symptoms/effects, acute and delayed	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause an allergic skin reaction. Dermatitis. Rash.
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. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media Foam. Powder. Dry sand. Carbon dioxide (CO₂).

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.

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. Avoid inhalation of dust. 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

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). This product is miscible in water. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the MSDS.

7. Handling and storage

A. Precautions for safe handling

Minimize dust generation and accumulation. Do not get this material in contact with eyes. Do not taste or swallow. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. 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. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Store in tightly closed container. Keep only in the original container. Store in a well-ventilated place. 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
Copper (CAS 7440-50-8)	STEL	2 mg/m ³	Dust and mist.
	TWA	1 mg/m ³	Dust and mist.
		0.1 mg/m ³	Fume.
Sodium Selenite (Na ₂ SeO ₃) (CAS 10102-18-8)	TWA	0.2 mg/m ³	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
Sodium Selenite (Na ₂ SeO ₃) (CAS 10102-18-8)	TWA	0.2 mg/m ³	

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. Provide eyewash station.

C. Personal protective equipment

- **Respiratory protection** In case of insufficient ventilation, wear suitable respiratory equipment. Chemical respirator with organic vapor cartridge.
- **Eye protection** Wear safety glasses with side shields (or goggles) and a face shield.
- **Hand protection** Wear appropriate chemical resistant gloves. Wear gloves to prevent metal cuts and skin abrasions during handling.
- **Body protection** Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Hygiene measures

Keep away from food and drink. 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	Brass.

B. Odor None.

C. Odor threshold Not applicable.

D. pH Not applicable.

E. Melting point/freezing point

Melting point	Undetermined.
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) Non-metallic component can partially dissolve.

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 Not available.

Other data

Density	7.96 g/cm ³ estimated
Explosive limit	Not applicable.
Explosive properties	Not explosive.
Explosivity	Not applicable.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity May be corrosive to metals.

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 Metals.

D. Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information**A. Information on likely routes of exposure**

- Respiratory organs Toxic if inhaled.
- Skin May cause an allergic skin reaction.
- Eyes Causes serious eye damage.
- Mouth Fatal if swallowed.

B. Information on health hazards

- **Acute toxicity (list all possible routes of exposure)** Fatal if swallowed. Toxic if inhaled.
- **Corrosivity or irritation to the skin** Prolonged skin contact may cause temporary irritation.
- **Serious eye damage/eye irritation** Causes serious eye damage.
- **Respiratory sensitization** Not a respiratory sensitizer.
- **Skin sensitization** May cause an allergic skin reaction.
- **Carcinogenic properties /Carcinogenicity**

IARC Monographs. Overall Evaluation of Carcinogenicity

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8) 3 Not classifiable as to carcinogenicity to humans.

- **Mutagenic properties /Mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
- **Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.
- **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

Toxic to aquatic life with long lasting effects. Based on available data, the classification criteria are not met for hazardous to the aquatic environment, acute hazard.

Components	Species	Test Results
Sodium Selenite (Na ₂ SeO ₃) (CAS 10102-18-8)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia magna) 1.1 mg/l, 48 hours
Fish	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss) 1.8 mg/l, 96 hours
Hazardous to the aquatic environment, acute hazard	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.	
Hazardous to the aquatic environment, long-term hazard	Toxic to aquatic life with long lasting effects.	

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

This product is miscible in water.

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

D002: Waste Corrosive material [pH ≤2 or ≥12.5, or corrosive to steel]
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.

General information IMDG Regulated Marine Pollutant.

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

Copper (CAS 7440-50-8)

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8)

Harmful Substances Requiring Special Medical Examination

Copper (CAS 7440-50-8)

Workplace Environmental Monitoring Harmful Materials

Copper (CAS 7440-50-8)

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8)

Occupational Exposure Limit

Copper (CAS 7440-50-8)

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8)

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

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8) 97-1-134

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

Copper (CAS 7440-50-8)

Hazardous substances in slag, dust, waste molding sand & sand from sand blast, waste refractories & ceramic pieces, residues of incineration, materials treated for stabilization, & waste catalysts 3 MG/L

Hazardous substances in sludge, waste absorbers and absorbers 3 MG/L

E. Restrictions under other foreign or domestic laws

Clean Air Conservation Act

Air Pollutants

Copper (CAS 7440-50-8)

Sodium Selenite (Na₂SeO₃) (CAS 10102-18-8)

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)

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