

**MATERION****1. Chemical and company identification**

<b>Name of chemical (Product name)</b>	<b>Ge-As-Se-Si 17-25-51-7 at% (17-25-55-3 wt%)</b>	
<b>Company name</b>	Materion Advanced Chemicals Inc.	
<b>Address</b>	407 N 13th Street 1316 W. St. Paul Avenue Milwaukee, WI 53233 United States	
<b>Division</b>	Milwaukee	
<b>Contact person</b>	Noreen Atkinson	
<b>Telephone</b>	414.212.0257	
<b>e-mail address</b>	advancedmaterials@materion.com	
<b>Emergency telephone number</b>	Chemtrec	800.424.9300
<b>Materion Code</b>	2JX	
<b>Reference number</b>	2JX	

**2. Hazards identification****GHS classification**

<b>Physical hazards</b>	The product is not classified according to GHS.	
<b>Health hazards</b>	Serious eye damage/eye irritation	Category 2
	Carcinogenicity	Category 1A
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 1 (blood system, cardiovascular system, central nervous system, circulatory system, digestive system, digestive tract, kidney, liver, nervous system, respiratory system, skin)
	Specific target organ toxicity, repeated exposure	Category 1 (blood system, circulatory system, digestive system, kidney, liver, nervous system, respiratory system, skin)
<b>Environmental hazards</b>	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 4

**GHS label elements****Symbols****Signal words**

Danger

**Hazard statement**

Causes serious eye irritation. May cause cancer. Suspected of damaging fertility or the unborn child. Causes damage to organs (blood system, cardiovascular system, central nervous system, circulatory system, digestive system, digestive tract, kidney, liver, nervous system, respiratory system, skin). Causes damage to organs (blood system, circulatory system, digestive system, kidney, liver, nervous system, respiratory system, skin) through prolonged or repeated exposure. Toxic to aquatic life. May cause long lasting harmful effects to aquatic life.

**Precautionary statement****Prevention**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

<b>Response</b>	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Call a POISON CENTER/doctor. If eye irritation persists: Get medical advice/attention.
<b>Storage</b>	Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Other hazards which do not result in classification</b>	None known.
<b>Supplemental information</b>	17% of the mixture consists of component(s) of unknown acute oral toxicity. 100% of the mixture consists of component(s) of unknown acute dermal toxicity. 75% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 20% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment. For further information, please contact the Product Stewardship Department at +1.800.862.4118.

### Main symptoms and emergency overview

<b>Main symptoms</b>	Narcosis. Headache. Behavioral changes. Decrease in motor functions. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. Rash. Defatting of the skin. Edema. Jaundice. Prolonged exposure may cause chronic effects.
<b>Emergency overview</b>	Causes damage to organs. May cause cancer. Causes serious eye irritation. Possible reproductive hazard. Prolonged exposure may cause chronic effects. Dangerous for the environment if discharged into watercourses. The material as sold in solid form is generally not considered hazardous. However, if the process involves grinding, melting, cutting or any other process that causes a release of dust or fumes, hazardous levels of airborne particulate could be generated.

## 3. Composition/information on ingredients

<b>Substance or mixture</b>	Mixture
	<b>Gazette notification</b>
<b>Components</b>	<b>CAS Number      ENCS no.      ISHL no.      Concentration (%)</b>
Selenium	7782-49-2                     55
Arsenic	7440-38-2                     25
Germanium	7440-56-4                     17
Silicon	7440-21-3                     3

**Chemical formula**      Se (7782-49-2), As (7440-38-2), Ge (7440-56-4), Si (7440-21-3)

## 4. First aid measures

<b>If inhaled</b>	Move to fresh air. Call a physician if symptoms develop or persist.
<b>If on skin</b>	Wash off with soap and water. Get medical attention if irritation develops and persists.
<b>If in eyes</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
<b>If swallowed</b>	Rinse mouth. Get medical attention if symptoms occur.
<b>Most important symptoms/effects, acute and delayed</b>	Narcosis. Headache. Behavioral changes. Decrease in motor functions. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. Rash. Defatting of the skin. Edema. Jaundice. Prolonged exposure may cause chronic effects.
<b>Protection of first-aid responders</b>	IF exposed or concerned: Get medical advice/attention. 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.
<b>Notes to physician</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

## 5. Fire-fighting measures

<b>Extinguishing media</b>	Foam. Powder. Dry sand. Carbon dioxide (CO2).
<b>Extinguishing media to avoid</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards</b>	During fire, gases hazardous to health may be formed.
<b>Special fire fighting procedures</b>	Move containers from fire area if you can do so without risk.
<b>Protection of fire-fighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**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, 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.

**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.

**Methods or materials for containment and cleaning up** Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: 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. Put material in suitable, covered, labeled containers.

## 7. Handling and storage

### Handling

**Technical measures (e.g. Local and general ventilation)** Provide adequate ventilation.

**Safe handling advice** Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid contact with eyes. Avoid prolonged exposure. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

**Contact avoidance measures** Strong oxidizing agents. Acids. Fluorine. Chlorine.

**Hygiene measures** Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking.

### Storage

**Safe storage conditions** Store locked up. Keep container tightly closed.

**Safe packaging materials** Store in original tightly closed container.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### Japan. OELs - ISHL. (Workplace Environment Assessment Standards)

Components	Type	Value
Arsenic (CAS 7440-38-2)	TLV	0.003 mg/m3

#### Japan. OELs - JSOH (Japan Society of Occupational Health: Recommendation of Occupational Exposure Limits)

Components	Type	Value
Selenium (CAS 7782-49-2)	TWA	0.1 mg/m3

#### US. ACGIH Threshold Limit Values

Components	Type	Value
Arsenic (CAS 7440-38-2)	TWA	0.01 mg/m3
Selenium (CAS 7782-49-2)	TWA	0.2 mg/m3

## Biological limit values

### ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Arsenic (CAS 7440-38-2)	35 µg/l	Inorganic arsenic, plus methylated metabolites, as As	Urine	*

\* - For sampling details, please see the source document.

### Engineering measures

Good general ventilation (typically 10 air changes per hour) 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.

### Personal protective equipment

<b>Respiratory protection</b>	Wear positive pressure self-contained breathing apparatus (SCBA).
<b>Hand protection</b>	Wear appropriate chemical resistant gloves.
<b>Eye protection</b>	Wear safety glasses with side shields (or goggles).
<b>Skin and body protection</b>	Wear suitable protective clothing. Use of an impervious apron is recommended.

## 9. Physical and chemical properties

### Appearance

<b>Physical state</b>	Solid.
<b>Form</b>	Solid.
<b>Color</b>	Not available.

**Odor** Not available.

**pH** Not available.

**Melting point/Freezing point** 356 °F (180 °C) estimated

**Boiling point, initial boiling point, and boiling range** 1265 °F (685 °C) estimated

**Flash point** Not available.

**Combustion characteristics (solid, gas)** Not available.

### Upper/lower flammability or explosive limits

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Explosive limit - lower (%)** Not available.

**Explosive limit - upper (%)** Not available.

**Vapor pressure** 3799.68 hPa estimated

**Vapor density** Not available.

**Specific gravity** 4.89 estimated

### Solubility(ies)

**Solubility (water)** Not available.

**Partition coefficient (n-octanol/water)** Not available.

**Auto-ignition temperature** Not available.

**Decomposition temperature** Not available.

**Viscosity (Coefficient of viscosity)** Not available.

### Other information

**Density** 4.89 g/cm3 estimated

**Explosive properties** Not explosive.  
**Oxidizing properties** Not oxidizing.

## 10. Stability and reactivity

**Reactivity** The product is stable and non-reactive under normal conditions of use, storage and transport.  
**Chemical 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** Acids. Strong oxidizing agents. Fluorine. Chlorine.  
**Hazardous decomposition products** No hazardous decomposition products are known.

## 11. Toxicological information

**Acute toxicity** Not known.  
**Skin corrosion/irritation** Prolonged skin contact may cause temporary irritation.  
**Serious eye damage/eye irritation** Causes serious eye irritation.  
**Respiratory or skin sensitization**  
**Respiratory sensitization** Not a respiratory sensitizer.  
**Skin sensitization** This product is not expected to cause skin sensitization.  
**Germ cell mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.  
**Carcinogenicity** May cause cancer.  
**ACGIH Carcinogens**  
Arsenic (CAS 7440-38-2) A1 Confirmed human carcinogen.  
**IARC Monographs. Overall Evaluation of Carcinogenicity**  
Arsenic (CAS 7440-38-2) 1 Carcinogenic to humans.  
Selenium (CAS 7782-49-2) 3 Not classifiable as to carcinogenicity to humans.  
**Japan Society for Occupational Health: Carcinogen**  
Arsenic (CAS 7440-38-2) 1 Carcinogenic to humans.  
**NTP Report on Carcinogens**  
Arsenic (CAS 7440-38-2) Known To Be Human Carcinogen.  
**Reproductive toxicity** Suspected of damaging fertility or the unborn child.  
**Specific target organ toxicity - single exposure** Causes damage to organs (blood system, cardiovascular system, central nervous system, circulatory system, digestive system, digestive tract, kidney, liver, nervous system, respiratory system, skin).  
**Specific target organ toxicity - repeated exposure** Causes damage to organs (blood system, circulatory system, digestive system, kidney, liver, nervous system, respiratory system, skin) through prolonged or repeated exposure.  
**Aspiration hazard** Not an aspiration hazard.

## 12. Ecological information

### Ecotoxicological data

Product	Species	Test Results
Ge-As-Se-Si 17-25-51-7 at% (17-25-55-3 wt%)		
<b>Aquatic</b>		
Fish	LC50	Fish 39.6 mg/l, 96 hours estimated
<b>Components</b>		
<b>Species</b>		
<b>Test Results</b>		
Arsenic (CAS 7440-38-2)		
<b>Aquatic</b>		
Fish	LC50	Fathead minnow (Pimephales promelas) 9.9 mg/l, 96 hours

**Ecotoxicity** Toxic to aquatic life. May cause long lasting harmful effects to aquatic life.

### Persistence and degradability

<b>Bioaccumulation</b>	No data available.
<b>Mobility in soil</b>	No data available for this product.
<b>Hazardous to the ozone layer</b>	No data available.
<b>Other hazardous 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

Dispose in accordance with all applicable regulations.

<b>Residual waste</b>	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).
<b>Contaminated 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>Local disposal regulations</b>	Contract with a disposal operator licensed by the Law on Disposal and Cleaning. 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 local/regional/national/international regulations. When your own wastewater treatment plant is not available, collect entire waste and then charge to a licensed industrial waste management professional with manifests for industrial waste.

### 14. Transport information

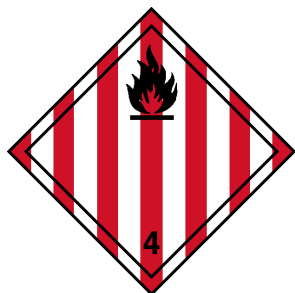
#### IATA

<b>UN number</b>	3178
<b>UN proper shipping name</b>	Flammable solid, inorganic, n.o.s. (Silicon)
<b>Transport hazard class(es)</b>	
<b>Class</b>	4.1
<b>Subsidiary risk</b>	-
<b>Packing group</b>	III
<b>Environmental hazards</b>	Yes
<b>ERG Code</b>	3L
<b>Special precautions for user</b>	Not available.
<b>Other information</b>	
<b>Passenger and cargo aircraft</b>	Allowed with restrictions.
<b>Cargo aircraft only</b>	Allowed with restrictions.

#### IMDG

<b>UN number</b>	3178
<b>UN proper shipping name</b>	FLAMMABLE SOLID, INORGANIC, N.O.S. (Silicon), MARINE POLLUTANT
<b>Transport hazard class(es)</b>	
<b>Class</b>	4.1
<b>Subsidiary risk</b>	-
<b>Packing group</b>	III
<b>Environmental hazards</b>	
<b>Marine pollutant</b>	Yes
<b>EmS</b>	F-A, S-G
<b>Special precautions for user</b>	Not available.
<b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable.
<b>General information</b>	IMDG Regulated Marine Pollutant.

IATA; IMDG



Marine pollutant



**National regulations** Follow regulation in section 15 for domestic transportation.  
**Emergency Response Guide Number** 133

## 15. Regulatory information

### Industrial Safety and Health Act

#### Specified substances regulation

##### Class 2 designated chemical substances

ARSENIC AND ITS COMPOUNDS (EXCLUDING ARSINE, GALLIUM ARSENIDE)

#### Notifiable substances

ARSENIC AND ARSENIC COMPOUNDS  
SELENIUM AND SELENIUM COMPOUNDS

Table 9 Ordinance No. 458 0 - 25 %

Table 9 Ordinance No. 333 0 - 55 %

#### Labeling substances

ARSENIC AND ARSENIC COMPOUNDS  
SELENIUM AND SELENIUM COMPOUNDS

0 - 25 %

0 - 55 %

### Poisonous and Deleterious Substances Control Act

#### Specified poisonous substances

Not regulated.

#### Poisonous substances

ARSENIC  
SELENIUM COMPOUNDS AND PREPARATIONS CONTAINING THEM, EXCEPT SELENIOUS ACID, SODIUM SELENITE AND SODIUM SELENATE

#### Deleterious substances

Not regulated.

### Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.

#### Class I specified chemical substances

Not regulated.

#### Class II specified chemical substances

Not regulated.

#### Monitoring chemical substances

Not regulated.

#### Priority Assessment Chemical Substances (PACs)

Not regulated.

#### Reporting Exempted Substances

Not regulated.

## Law concerning Pollutant Release and Transfer Register

### Specified class 1 substances (substance name, ordinance number and content)

ARSENIC AND ITS INORGANIC COMPOUNDS                      Ordinance No. 332    25 %                      (Arsenic)

### Class 1 substances (substance name, ordinance number and content)

SELENIUM AND ITS COMPOUNDS                      Ordinance No. 242    55 %                      (Selenium)

### Class 2 substances (substance name, ordinance number and content)

Not regulated.

**Ship Safety Law, Dangerous Goods Marine Transport and Storage Rule**                      Flammable solid materials

**Air Law, Enforcement Rule**                      Flammable solid materials

### Explosives Control Act

Not regulated.

### Soil Pollution Control Law

#### Cutoff for 2nd elution standard

ARSENIC	Class 2	0.3 MG/L
ARSENIC & ITS COMPOUNDS	Class 2	0.3 MG/L Total As
SELENIUM	Class 2	0.3 MG/L
SELENIUM & ITS COMPOUNDS	Class 2	0.3 MG/L Total Se

#### Cutoff for ground water standard

ARSENIC	Class 2	0.01 MG/L
ARSENIC & ITS COMPOUNDS	Class 2	0.01 MG/L Total As
SELENIUM	Class 2	0.01 MG/L
SELENIUM & ITS COMPOUNDS	Class 2	0.01 MG/L Total Se

#### Cutoff for soil content standard

ARSENIC	Class 2	150 MG/KG
ARSENIC & ITS COMPOUNDS	Class 2	150 MG/KG Total As
SELENIUM	Class 2	150 MG/KG
SELENIUM & ITS COMPOUNDS	Class 2	150 MG/KG Total Se

#### Cutoff for soil elution standard

ARSENIC	Class 2	0.01 MG/L
ARSENIC & ITS COMPOUNDS	Class 2	0.01 MG/L Total As
SELENIUM	Class 2	0.01 MG/L
SELENIUM & ITS COMPOUNDS	Class 2	0.01 MG/L Total Se

### Waste Management and Public Cleansing Act

DUST CONTAINING ARSENIC AND ITS COMPOUNDS

DUST CONTAINING SELENIUM AND ITS COMPOUNDS

SLUDGE, SPENT ACID, AND WASTE ALKALI CONTAINING ARSENIC AND ITS COMPOUNDS

SLUDGE, SPENT ACID, AND WASTE ALKALI CONTAINING SELENIUM AND ITS COMPOUNDS

### Water Pollution Control Act

ARSENIC AND ITS COMPOUNDS (TOTAL AS)

SELENIUM AND ITS COMPOUNDS (TOTAL SE)

### Sewage Act

ARSENIC AND ITS COMPOUNDS (AS AS)                      0.1 MG/L

SELENIUM AND ITS COMPOUNDS (AS SE)                      0.1 MG/L

## 16. Other information

### Bibliography

ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices  
HSDB® - Hazardous Substances Data Bank  
IARC Monographs. Overall Evaluation of Carcinogenicity  
National Toxicology Program (NTP) Report on Carcinogens  
Japan Society for Occupational Health, Recommendation of Occupational Exposure Limits  
Japan Chemical Industry Association (JCIA) GHS Guideline, June 2012  
JIS Z 7252:2014 Classification of chemicals based on "Globally Harmonized System of Classification and Labelling of Chemicals (GHS)"  
JIS Z 7253:2012 Hazard communication of chemicals based on GHS - Labelling and Safety Data Sheet (SDS)



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**Revision information**                      Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Ingredients