



SAFETY DATA SHEET

MATERION

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

| | |
|------------------------------|---|
| Name of the substance | Copper indium selenide (CuInSe ₂) |
| Identification number | 12018-95-0 (CAS number) |
| Registration number | - |
| Document number | 1IJ |
| Synonyms | COPPER INDIUM DISELENIDE |
| Materion Code | 1IJ |
| Issue date | 30-October-2013 |
| Revision date | 10-January-2018 |

1.3. Details of the supplier of the safety data sheet

Supplier

| | |
|-----------------------|---|
| Company name | Materion Advanced Chemicals Inc. |
| Address | 407 N. 13th Street 1316 W. St. Paul Avenue Milwaukee, WI 53233 United States |
| Division | Milwaukee |
| Telephone | 414.212.0257 |
| e-mail | advancedmaterials@materion.com |
| Contact person | Laura Hamilton |

1.4. Emergency telephone number

| | |
|------------------------|--------------|
| Supersedes date | 14-July-2015 |
| Version number | 04 |

1.2. Relevant identified uses of the substance or mixture and uses advised against

| | |
|-----------------------------|--|
| Identified uses | The chemical(s) listed herein is not found on the Toxic Substance Control Act chemical substance inventory. This chemical may not be used for commercial purposes. This chemical may be used for research and development purposes only as defined at 40 CFR 710,2(y). |
| Uses advised against | None known. |

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The substance has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

This substance does not meet the criteria for classification according to Regulation (EC) 1272/2008 as amended.

| | |
|-----------------------|----------------|
| Hazard summary | Not available. |
|-----------------------|----------------|

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

| | |
|--------------------------|--|
| Contains: | Copper indium selenide |
| Hazard pictograms | None. |
| Signal word | None. |
| Hazard statements | The substance does not meet the criteria for classification. |

Precautionary statements

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

| | |
|---------------------------------------|-------|
| Supplemental label information | None. |
|---------------------------------------|-------|

2.3. Other hazards

The Safety Information Sheet Chemicals of hazardous chemical can be obtained through phone, email or on the company website.

SECTION 3: Composition/information on ingredients

3.1. Substances

General information

| Chemical name | % | CAS-No. / EC No. | REACH Registration No. | Index No. | Notes |
|------------------------|----------|------------------|------------------------|-----------|-------|
| Copper indium selenide | 90 - 100 | 12018-95-0 | - | - | |
| Classification: | - | | | | |

List of abbreviations and symbols that may be used above

CLP: Regulation No. 1272/2008.

DSD: Directive 67/548/EEC.

M: M-factor

vPvB: very persistent and very bioaccumulative substance.

PBT: persistent, bioaccumulative and toxic substance.

#: This substance has been assigned Community workplace exposure limit(s).

SECTION 4: First aid measures

General information

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.

4.1. Description of first aid measures

Inhalation

Do not use mouth-to-mouth method if victim inhaled the substance. Call a physician or poison control centre immediately.

Skin contact

Remove and isolate contaminated clothing and shoes. Immediately flush skin with plenty of water. Wash clothing separately before reuse.

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes. Continue rinsing.

Ingestion

IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician. Rinse mouth thoroughly. 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.

4.2. Most important symptoms and effects, both acute and delayed

Direct contact with eyes may cause temporary irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards

No unusual fire or explosion hazards noted.

5.1. Extinguishing media

Suitable extinguishing media

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

None known.

5.2. Special hazards arising from the substance or mixture

During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters

Wear suitable protective equipment.

Special firefighting procedures

Use water spray to cool unopened containers.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

For emergency responders

Keep unnecessary personnel away.

6.2. Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

6.4. Reference to other sections

Not available.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Avoid prolonged exposure.

7.2. Conditions for safe storage, including any incompatibilities

Store in original tightly closed container. Store in a well-ventilated place. Store in accordance with local/regional/national/international regulation.

7.3. Specific end use(s)

Not available.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****Occupational exposure limits****Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001**

| Material | Type | Value | Form |
|--|------|-----------------------|---------------------|
| Copper indium selenide (CAS 12018-95-0) | MAK | 0,1 mg/m ³ | Inhalable fraction. |
| | STEL | 0,2 mg/m ³ | Inhalable fraction. |

Belgium. Exposure Limit Values.

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Croatia. Dangerous Substance Exposure Limit Values in the Workplace (ELVs), Annexes 1 and 2, Narodne Novine, 13/09

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | MAC | 0,1 mg/m ³ |
| | STEL | 0,3 mg/m ³ |

Denmark. Exposure Limit Values

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TLV | 0,1 mg/m ³ |

Finland. Workplace Exposure Limits

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Greece. OELs (Decree No. 90/1999, as amended)

| Material | Type | Value |
|--|------|---------------------|
| Copper indium selenide (CAS 12018-95-0) | STEL | 1 mg/m ³ |
| | TWA | 1 mg/m ³ |

Iceland. OELs. Regulation 154/1999 on occupational exposure limits

| Material | Type | Value | Form |
|--|------|-----------------------|-------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ | Dust. |

Ireland. Occupational Exposure Limits

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | STEL | 0,3 mg/m ³ |
| | TWA | 0,1 mg/m ³ |

Italy. Occupational Exposure Limits

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Lithuania. OELs. Limit Values for Chemical Substances, General Requirements

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Norway. Administrative Norms for Contaminants in the Workplace

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TLV | 0,1 mg/m ³ |

Portugal. VLEs. Norm on occupational exposure to chemical agents (NP 1796)

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Slovenia. OELs. Regulations concerning protection of workers against risks due to exposure to chemicals while working (Official Gazette of the Republic of Slovenia)

| Material | Type | Value | Form |
|--|------|-----------------------|---------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ | Inhalable fraction. |

Spain. Occupational Exposure Limits

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ |

Sweden. OELs. Work Environment Authority (AV), Occupational Exposure Limit Values (AFS 2015:7)

| Material | Type | Value | Form |
|--|------|-----------------------|-------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ | Total dust. |

Switzerland. SUVA Grenzwerte am Arbeitsplatz

| Material | Type | Value | Form |
|--|------|-----------------------|-----------------|
| Copper indium selenide (CAS 12018-95-0) | TWA | 0,1 mg/m ³ | Inhalable dust. |

UK. EH40 Workplace Exposure Limits (WELs)

| Material | Type | Value |
|--|------|-----------------------|
| Copper indium selenide (CAS 12018-95-0) | STEL | 0,3 mg/m ³ |
| | | 0 ppm |
| | TWA | 0,1 mg/m ³ |

Biological limit values No biological exposure limits noted for the ingredient(s).

Recommended monitoring procedures Follow standard monitoring procedures.

Derived no effect levels (DNELs) Not available.

Predicted no effect concentrations (PNECs) Not available.

8.2. Exposure controls

Appropriate engineering controls 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.

Individual protection measures, such as personal protective equipment

General information Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

- **Hand protection** Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

- **Other** Wear chemical protective equipment that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

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.

Environmental exposure controls Environmental manager must be informed of all major releases.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties****Appearance**

Physical state Solid.

Form Solid.

Colour Not available.

Odour Not available.

Odour threshold Not available.

pH Not available.

Melting point/freezing point Not available.

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Vapour pressure Not available.

Vapour density Not available.

Relative density Not available.

Solubility(ies)

Solubility (water) Not available.

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

Auto-ignition temperature Not available.

Decomposition temperature Not available.

Viscosity Not available.

Explosive properties Not explosive.

Oxidising properties Not oxidising.

9.2. Other information No relevant additional information available.

SECTION 10: Stability and reactivity

10.1. Reactivity Not available.

10.2. Chemical stability Material is stable under normal conditions.

10.3. Possibility of hazardous reactions No dangerous reaction known under conditions of normal use.

10.4. Conditions to avoid Contact with incompatible materials.

10.5. Incompatible materials None known.

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

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation Prolonged inhalation may be harmful.
Skin contact Due to lack of data the classification is not possible.
Eye contact Due to lack of data the classification is not possible.
Ingestion Due to lack of data the classification is not possible.

Symptoms Exposure may cause temporary irritation, redness, or discomfort.

11.1. Information on toxicological effects

Acute toxicity No data available.
Skin corrosion/irritation Due to partial or complete lack of data the classification is not possible.
Serious eye damage/eye irritation Due to partial or complete lack of data the classification is not possible.
Respiratory sensitisation Due to partial or complete lack of data the classification is not possible.
Skin sensitisation Due to partial or complete lack of data the classification is not possible.
Germ cell mutagenicity Due to partial or complete lack of data the classification is not possible.
Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

Hungary. 26/2000 EüM Ordinance on protection against and preventing risk relating to exposure to carcinogens at work (as amended)

Not listed.

Reproductive toxicity Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - single exposure Due to partial or complete lack of data the classification is not possible.
Specific target organ toxicity - repeated exposure Due to partial or complete lack of data the classification is not possible.
Aspiration hazard Due to partial or complete lack of data the classification is not possible.
Mixture versus substance information No information available.
Other information This product has no known adverse effect on human health.

SECTION 12: Ecological information

12.1. Toxicity 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.
12.2. Persistence and degradability No data is available on the degradability of this product.
12.3. Bioaccumulative potential No data available.
Partition coefficient n-octanol/water (log Kow) Not available.
Bioconcentration factor (BCF) Not available.
12.4. Mobility in soil No data available.
12.5. Results of PBT and vPvB assessment Not a PBT or vPvB substance or mixture.
12.6. 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.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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.
EU waste code The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose in accordance with all applicable regulations.

Special precautions

Dispose in accordance with all applicable regulations.

SECTION 14: Transport information**ADR**

| | |
|---|----------------------------------|
| 14.1. UN number | UN3283 |
| 14.2. UN proper shipping name | Selenium compound, solid, n.o.s. |
| 14.3. Transport hazard class(es) | |
| Class | 6.1(PGIII) |
| Subsidiary risk | - |
| Label(s) | 6.1 |
| Hazard No. (ADR) | Not available. |
| Tunnel restriction code | Not available. |
| 14.4. Packing group | III |
| 14.5. Environmental hazards | No. |
| 14.6. Special precautions for user | Not available. |

RID

| | |
|---|----------------------------------|
| 14.1. UN number | UN3283 |
| 14.2. UN proper shipping name | Selenium compound, solid, n.o.s. |
| 14.3. Transport hazard class(es) | |
| Class | 6.1(PGIII) |
| Subsidiary risk | - |
| Label(s) | 6.1 |
| 14.4. Packing group | III |
| 14.5. Environmental hazards | No. |
| 14.6. Special precautions for user | Not available. |

ADN

| | |
|---|----------------------------------|
| 14.1. UN number | UN3283 |
| 14.2. UN proper shipping name | Selenium compound, solid, n.o.s. |
| 14.3. Transport hazard class(es) | |
| Class | 6.1(PGIII) |
| Subsidiary risk | - |
| Label(s) | 6.1 |
| 14.4. Packing group | III |
| 14.5. Environmental hazards | No. |
| 14.6. Special precautions for user | Not available. |

IATA

| | |
|---|----------------------------------|
| 14.1. UN number | UN3283 |
| 14.2. UN proper shipping name | Selenium compound, solid, n.o.s. |
| 14.3. Transport hazard class(es) | |
| Class | 6.1(PGIII) |
| Subsidiary risk | - |
| 14.4. Packing group | III |
| 14.5. Environmental hazards | No. |
| ERG Code | 6L |
| 14.6. Special precautions for user | Not available. |

Other information

| | |
|-------------------------------------|----------------------------|
| Passenger and cargo aircraft | Allowed with restrictions. |
| Cargo aircraft only | Allowed with restrictions. |

IMDG

| | |
|--------------------------------------|----------------------------------|
| 14.1. UN number | UN3283 |
| 14.2. UN proper shipping name | SELENIUM COMPOUND, SOLID, N.O.S. |

14.3. Transport hazard class(es)

Class 6.1(PGIII)

Subsidiary risk -

14.4. Packing group III

14.5. Environmental hazards

Marine pollutant No.

EmS F-A, S-A

14.6. Special precautions for user Not available.

ADN; ADR; IATA; IMDG; RID



SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

Not listed.

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

The product is classified and labelled in accordance with EC directives or respective national laws. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006. The product does not need to be labelled in accordance with EC directives or respective national laws.

National regulations Follow national regulation for work with chemical agents.

15.2. Chemical safety assessment No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations Not available.

References ACGIH
EPA: AQUIRE database
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents

Training information Follow training instructions when handling this material.

Disclaimer Additional information is given in the Material Safety Data Sheet. Materion Advanced Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.
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