MATERION

SAFETY DATA SHEET

1. Identification

Product identifier Copper Clad

Other means of identification

SDS number W41

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Materion Advanced Materials Technologies and Services Inc.

Address 2978 Main Street

Buffalo, NY 14214 Buffalo, NY 14214 United States

Telephone716-837-1000Websitematerion.com

E-mail ehs1@materion.com

Emergency phone number (800) 424-9300 Chemtrec

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Acute toxicity, oral Category 4

Acute toxicity, inhalation

Category 4

Sensitization, respiratory

Category 1

Sensitization, skin

Category 1

Carcinogenicity

Category 2

Reproductive toxicity (fertility, the unborn

Category 1A

child)

Specific target organ toxicity, repeated Category 2

exposure

Environmental hazards Hazardous to the aquatic environment, acute Category 1

hazard

Hazardous to the aquatic environment, Category 1

long-term hazard

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Harmful if swallowed. May cause an allergic skin reaction. Harmful if inhaled. May cause allergy

or asthma symptoms or breathing difficulties if inhaled. Suspected of causing cancer. May damage fertility. May damage the unborn child. May cause damage to organs through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Material name: Copper Clad SDS US

1669 Version #: 01 Issue date: 08-20-2015

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. Avoid breathing dust. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face

protection. In case of inadequate ventilation wear respiratory protection.

Response If swallowed: Call a poison center/doctor if you feel unwell. If on skin: Wash with plenty of water. If

inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor if you feel unwell. Rinse mouth. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a

poison center/doctor. Wash contaminated clothing before reuse. Collect spillage.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

None known.

Supplemental information 81.48% of the mixture consists of component(s) of unknown acute oral toxicity. 29.29% of the

mixture consists of component(s) of unknown acute hazards to the aquatic environment. 29.29%

of the mixture consists of component(s) of unknown long-term hazards to the aquatic

environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Copper		7440-50-8	60 - 98
Lead		7439-92-1	15 - 35
Aluminum		7429-90-5	10 - 30
Indium		7440-74-6	1 - 14
Tin		7440-31-5	0 - 15
Gold		7440-57-5	1 - 6
Nickel		7440-02-0	2 - 5
Silver		7440-22-4	1 - 4

^{*}Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

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. If experiencing respiratory symptoms: Call a POISON CENTER

or doctor/physician.

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.

Eye contact Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Get medical advice/attention if you feel unwell.

Most important

symptoms/effects, acute and

delayed

needed

Abdominal pain. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment

Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim

under observation. Symptoms may be delayed.

Material name: Copper Clad SDS US

1669 Version #: 01 Issue date: 08-20-2015

General information

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. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media

Powder. Dry sand.

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire. Carbon dioxide (CO2).

Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed.

Special protective equipment

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

and precautions for firefighters
Fire fighting

Move containers from fire area if you can do so without risk.

equipment/instructions

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

General fire hazards

Specific methods

No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

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 SDS.

Methods and materials for containment and cleaning up

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material, if this is without risk. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Prevent entry into waterways, sewer, basements or confined areas. 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.

Environmental precautions

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Do not taste or swallow. 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. 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.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US	OSHA Specifically	/ Regulated	Substances	(29 CFR	1910.1001-1050)	
oo.		, i togulatou	Cubsianices	120 01 11	1010.1001-1000/	

Components		Type			Value	
Lead (CAS 7439-92-1)		TWA			0.05 mg/m3	
US. OSHA Table Z-1 Lim	its for Air Contam	inants (29	9 CFR 1910.1000)		
Components		Туре			Value	Form
Aluminum (CAS 7429-90	-5)	PEL			5 mg/m3	Respirable dust.
					15 mg/m3	Total dust.
Copper (CAS 7440-50-8)		PEL			1 mg/m3	Dust and mist.
					0.1 mg/m3	Fume.
Nickel (CAS 7440-02-0)		PEL			1 mg/m3	
Silver (CAS 7440-22-4)		PEL			0.01 mg/m3	
Tin (CAS 7440-31-5)		PEL			2 mg/m3	
US. ACGIH Threshold Li	mit Values					
Components		Type			Value	Form
Aluminum (CAS 7429-90	-5)	TWA			1 mg/m3	Respirable fraction.
Indium (CAS 7440-74-6)		TWA			0.1 mg/m3	
Lead (CAS 7439-92-1)		TWA			0.05 mg/m3	
Nickel (CAS 7440-02-0)		TWA			1.5 mg/m3	Inhalable fraction.
Silver (CAS 7440-22-4)		TWA			0.1 mg/m3	Dust and fume.
Tin (CAS 7440-31-5)		TWA			2 mg/m3	
US. NIOSH: Pocket Guid	e to Chemical Haz	zards				
Components		Type			Value	Form
Aluminum (CAS 7429-90	-5)	TWA			5 mg/m3	Respirable.
					5 mg/m3	Welding fume or
						pyrophoric powder.
					10 mg/m3	Total
Copper (CAS 7440-50-8)		TWA			1 mg/m3	Dust and mist.
Indium (CAS 7440-74-6)		TWA			0.1 mg/m3	
Lead (CAS 7439-92-1)		TWA			0.05 mg/m3	
Nickel (CAS 7440-02-0)		TWA			0.015 mg/m3	
Silver (CAS 7440-22-4)		TWA			0.01 mg/m3	Dust.
Tin (CAS 7440-31-5)		TWA			2 mg/m3	
ogical limit values						
ACGIH Biological Exposu						
Components	Value		Determinant	Specimen	Sampling T	ime

^{* -} For sampling details, please see the source document.

Control parameters Follow standard monitoring procedures.

Individual protection measures, such as personal protective equipment

Eye/face protection If contact is likely, safety glasses with side shields are recommended.

Skin protection

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

supplier.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection Wear positive pressure self-contained breathing apparatus (SCBA).

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

Material name: Copper Clad SDS US

1669 Version #: 01 Issue date: 08-20-2015

General hygiene considerations

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

Appearance

Physical state Solid.
Form Solid.

ColorNot available.OdorNot applicable.Odor thresholdNot available.pHNot available.

Melting point/freezing point 313.88 °F (156.6 °C) estimated Initial boiling point and boiling 3164 °F (1740 °C) estimated

range

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower

(%)

Not available.

Not available.

0.36 hPa estimated

Flammability limit - upper

(%)

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor densityNot available.Relative densityNot available.

Solubility(ies)

Vapor pressure

Solubility (water) Not available.

Partition coefficient Not available.

(n-octanol/water)

Auto-ignition temperature 1166 °F (630 °C) estimated

Decomposition temperatureNot available. **Viscosity**Not available.

Other information

Density 8.61 g/cm3 estimated

Explosive properties Not explosive.

Oxidizing properties Not oxidizing.

Specific gravity 8.61 estimated

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 Strong oxidizing agents. Chlorine.

1669 Version #: 01 Issue date: 08-20-2015

No hazardous decomposition products are known.

products

11. Toxicological information

Information on likely routes of exposure

Inhalation Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact May cause an allergic skin reaction.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Abdominal pain. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

Information on toxicological effects

Acute toxicity Harmful if inhaled. Harmful if swallowed. May cause an allergic skin reaction.

 Components
 Species
 Test Results

 Silver (CAS 7440-22-4)

<u>Acute</u>

Dermal

LD50 Rat > 2000 mg/kg

Oral

LD50 Rat > 5000 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye Direct contact with eyes may cause temporary irritation.

irritation

Respiratory or skin sensitization

Respiratory sensitization May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin sensitization May cause an allergic skin reaction.

Germ cell mutagenicity

No data available to indicate product or any components present at greater than 0.1% are

mutagenic or genotoxic.

Carcinogenicity Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Lead (CAS 7439-92-1)

2B Possibly carcinogenic to humans.

Nickel (CAS 7440-02-0)

2B Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Lead (CAS 7439-92-1) Reasonably Anticipated to be a Human Carcinogen.

Nickel (CAS 7440-02-0) Reasonably Anticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity May damage fertility. May damage the unborn child.

Specific target organ toxicity -

single exposure

Not classified.

Specific target organ toxicity -

repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may

be harmful. Prolonged exposure may cause chronic effects.

^{*} Estimates for product may be based on additional component data not shown.

12. Ecological information

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

Product		Species	Test Results
Copper Clad			
Aquatic			
Crustacea	EC50	Daphnia	0.1528 mg/l, 48 hours estimated
Fish	LC50	Fish	3.6429 mg/l, 96 hours estimated
Components		Species	Test Results
Aluminum (CAS 7429-90-5)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.16 mg/l, 96 hours
Nickel (CAS 7440-02-0)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	2.923 mg/l, 96 hours
Silver (CAS 7440-22-4)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.0002 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	0.0023 - 0.0033 mg/l, 96 hours

^{*} Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available. Mobility in soil No data available.

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

Disposal instructions 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

local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste

disposal company.

Waste from residues / unused

products

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.

14. Transport information

DOT

UN3077 **UN number**

UN proper shipping name Transport hazard class(es) Environmentally hazardous substances, solid, n.o.s. (Aluminum)

Class 9

Material name: Copper Clad 1669 Version #: 01 Issue date: 08-20-2015 Subsidiary risk Label(s) 9
Packing group III

Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

Special provisions

8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33

Packaging exceptions 155
Packaging non bulk 213
Packaging bulk 240

IATA

UN number UN3077

UN proper shipping name Environmentally hazardous substance, solid, n.o.s.

Transport hazard class(es)

Class 9
Subsidiary risk Packing group III
Environmental hazards No.
ERG Code 9L

Special precautions for user

Other information

Read safety instructions, SDS and emergency procedures before handling.

Passenger and cargo

aircraft

Allowed.

Cargo aircraft only Allowed.

IMDG

UN number UN3077

UN proper shipping name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

Transport hazard class(es)

Class 9
Subsidiary risk Packing group III

Environmental hazards

Marine pollutant No. EmS F-A, S-F

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

DOT; IATA; IMDG



General information IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication

Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8) Listed. Lead (CAS 7439-92-1) Listed.

Material name: Copper Clad

SDS US

Nickel (CAS 7440-02-0) Listed. Silver (CAS 7440-22-4) Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1) Reproductive toxicity

Central nervous system

Kidney Blood

Acute toxicity

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes

Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous

No

chemical

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.	
Copper	7440-50-8	60 - 98	
Lead	7439-92-1	15 - 35	
Aluminum	7429-90-5	10 - 30	
Nickel	7440-02-0	2 - 5	
Silver	7440-22-4	1 - 4	

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Lead (CAS 7439-92-1) Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act

Not regulated.

(SDWA)

US state regulations

US - New Jersey RTK - Substances: Listed substance

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Indium (CAS 7440-74-6)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

Tin (CAS 7440-31-5)

US - Pennsylvania RTK - Hazardous Substances: All compounds of this substance are considered environmental hazards

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Nickel (CAS 7440-02-0)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Aluminum (CAS 7429-90-5)

Material name: Copper Clad 1669 Version #: 01 Issue date: 08-20-2015 Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

Tin (CAS 7440-31-5)

US. Massachusetts RTK - Substance List

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Indium (CAS 7440-74-6)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

Tin (CAS 7440-31-5)

US. New Jersey Worker and Community Right-to-Know Act

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

US. Pennsylvania RTK - Hazardous Substances

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Indium (CAS 7440-74-6)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

Tin (CAS 7440-31-5)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Indium (CAS 7440-74-6)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

Tin (CAS 7440-31-5)

US. Rhode Island RTK

Aluminum (CAS 7429-90-5)

Copper (CAS 7440-50-8)

Lead (CAS 7439-92-1)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Lead (CAS 7439-92-1) Listed: October 1, 1992 Listed: October 1, 1989 Nickel (CAS 7440-02-0)

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Lead (CAS 7439-92-1) Listed: February 27, 1987

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Lead (CAS 7439-92-1) Listed: February 27, 1987

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Lead (CAS 7439-92-1) Listed: February 27, 1987

SDS US Material name: Copper Clad 10 / 11

16. Other information, including date of preparation or last revision

Issue date 08-20-2015

Version # 01

Disclaimer

Materion - Buffalo 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.

This document has been prepared using data from sources considered to be technically reliable and the information is believed to be correct. Materion makes no warranties, expressed or implied, as to the accuracy of the information contained herein. Materion cannot anticipate all conditions under which this information and its products may be used and the actual conditions of use are beyond its control. The user is responsible to evaluate all available information when using this product for any particular use and to comply with all Federal, State, Provincial and Local laws,

statutes and regulations.