MATERION

MATERIAL SAFETY DATA SHEET

1. Chemical product and company identification

A. Product name ToughMet® Alloys

Other means of identification

SDS number L19

Synonym(s) ToughMet® 2, ToughMet® 3, BrushForm® 158, BrushForm® 96, BF 158, BF 96, Copper Alloy, Copper Nickel Alloy, Copper Nickel Tin Alloy, Spinodal Alloy, T2, T3, ArmaMet™, C72700, C72900, C96900, C96950, C96970, EquiMet® 2, EquiMet® 3

B. Recommended use and Limitations on use

Recommended use Industrial uses: Uses of substances as such or in preparations at industrial sites
Offshore industries
Manufacture of basic metals, including alloys
Manufacture of computer, electronic and optical products, electrical equipment
General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Electricity, steam, gas water supply and sewage treatment
Scientific research and development
Other: Manufacture of medical and defense equipment

C. Supplier information

Company name Materion Brush Inc.

Address 6070 Parkland Boulevard
Mayfield Heights OH 44124
United States

Email ehs@materion.com

Contact person Theodore Knudson

Emergency telephone number +1.216.383.4019

2. Hazards identification

A. Hazard category/Classification

Physical hazards	Not classified.	
Health hazards	Sensitization, skin	Category 1
	Carcinogenicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 1 (Respiratory system)
Environmental hazards	Not classified.	

B. Warning label items including precautionary statement

• Pictogram None.

• Signal word None.

• Hazard statement

H372 Causes damage to organs (respiratory system) through prolonged or repeated exposure by inhalation.

• Precautionary statement

Prevention

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P284 In case of inadequate ventilation wear respiratory protection.

Response

P302 + P350	If on skin: Wash with plenty of water.
P308 + P313	If exposed or concerned: Get medical advice/attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P342 + P311	If experiencing respiratory symptoms: Call a poison center/doctor.
P363	Wash contaminated clothing before reuse.

Storage

P405	Store locked up.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international 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	69.95 - 85
Nickel		7440-02-0	KE-25818	8.5 - 15.5
Tin		7440-31-5	KE-33838	5.5 - 8.5
Iron		7439-89-6	KE-21059	0 - 0.5
Zinc		7440-66-6	KE-35518	0 - 0.5

4. First aid measures

A. In case of eye contact Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally.

B. In case of skin contact Thoroughly wash skin cuts or wounds to remove all particulate debris from the wound. Seek medical attention for wounds that cannot be thoroughly cleansed. Treat skin cuts and wounds with standard first aid practices such as cleansing, disinfecting and covering to prevent wound infection and contamination before continuing work. Obtain medical help for persistent irritation. Material accidentally implanted or lodged under the skin must be removed.

C. In case of inhalation Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

D. In case of swallowing Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

E. Note to physician Not applicable.

General advice Under normal conditions of intended use, this material does not pose a risk to health.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	The product is non-combustible. Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	Not applicable, non-combustible. None known.

B. Specific hazards arising from the chemical (example: hazardous combustion products) Product is not considered combustible.

C. Specific methods of fire-fighting

Special protective equipment for firefighters	Wear suitable protective equipment.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency measures As supplied, this product poses no special release issues.

B. Environmental precautions Not relevant, due to the form of the product.

C. Methods and materials for containment and cleaning up Not relevant, due to the form of the product.

7. Handling and storage

A. Precautions for safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.

B. Conditions for safe storage (including any incompatibilities) Store locked up. Keep out of the reach of children.

8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. Exposure Limits for Chemicals and Physical Agents, Occupational Safety and Health Act "K-OSHA" Article 106

Components	Type	Value	Form
Copper (CAS 7440-50-8)	STEL	2 mg/m3	Dust and mist.
	TWA	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	
Tin (CAS 7440-31-5)	TWA	2 mg/m3	

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	Inhalable fraction.

Biological limit values

ACGIH Biological Exposure Indices (BEI)

Components	Value	Determinant	Specimen	Sampling Time
Nickel (CAS 7440-02-0)	5 µg/l	Nickel	Urine	*

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

B. 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.

C. Personal protective equipment

• Respiratory protection When airborne exposures exceed or have the potential to exceed the occupational exposure limits, approved respirators must be used as specified by an Industrial Hygienist or other qualified professional. Respirator users must be medically evaluated to determine if they are physically capable of wearing a respirator. Quantitative and/or qualitative fit testing and respirator training must be satisfactorily completed by all personnel prior to respirator use. Users of tight fitting respirators must be clean shaven on those areas of the face where the respirator seal contacts the face. Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air cleaning device.

• Eye protection Wear approved safety glasses, goggles, face shield and/or welder’s helmet when risk of eye injury is present, particularly during operations that generate dust, mist or fume.

• Hand protection Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.

• Body protection Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities.

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. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

A. Appearance	
Physical state	Solid.
Form	Various shapes.
Color	Bronze.
B. Odor	Not applicable.
C. Odor threshold	Not applicable.
D. pH	Not applicable.
E. Melting point/freezing point	
Melting point	1742 °F (950 °C) estimated
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)	Not applicable.
J. Upper/lower limit on flammability or explosive limits	
Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
K. Vapor pressure	0.61 hPa estimated
L. Solubility	
Solubility (water)	Not applicable.
M. Vapor density	Not applicable.
N. Specific gravity	8.8 estimated
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	8.80 g/cm3 estimated
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Relative density	Not applicable.

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)	Contact with incompatible materials.
C. Incompatible materials	Strong acids. 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**	Not relevant, due to the form of the product.
• **Mouth**	May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure.

B. Information on health hazards

• **Acute toxicity (list all possible routes of exposure)**	Harmful if swallowed. May cause an allergic skin reaction. May cause respiratory irritation.
• **Corrosivity or irritation to the skin**	Not likely, due to the form of the product.
• **Serious eye damage/eye irritation**	Not likely, due to the form of the product.
• **Respiratory sensitization**	May cause damage to organs (respiratory system) through prolonged or repeated exposure.
• **Skin sensitization**	May cause an allergic skin reaction.
• **Carcinogenic properties /Carcinogenicity**	Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.

• **Mutagenic properties /Mutagenicity**	Not classified.
• **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**	May cause damage to organs through prolonged or repeated exposure.
• **Aspiration hazard**	Not an aspiration hazard.

12. Ecological information

A. Ecotoxicity

Product		**Species**	**Test Results**
ToughMet® Alloys			
Aquatic			
Acute			
Crustacea	EC50	Daphnia	280 mg/l, 48 hours estimated
Fish	LC50	Fish	0.037 mg/l, 96 hours estimated
Components		**Species**	**Test Results**
Copper (CAS 7440-50-8)			
Aquatic			
Acute			
Crustacea	EC50	Blue crab (Callinectes sapidus)	0.0031 mg/l
Fish	LC50	Chinook salmon (Oncorhynchus tshawytscha)	0.02 mg/l, 96 hours
Nickel (CAS 7440-02-0)			
Aquatic			
Acute			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.06 mg/l, 4 days

Components		Species	Test Results
Zinc (CAS 7440-66-6)			
Aquatic			
Acute			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.41 mg/l, 96 hours

Hazardous to the aquatic environment, acute hazard Not relevant, due to the form of the product.

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

C. Bioaccumulative potential Not available.

D. Mobility in soil Not available.

E. Other adverse effects Not available.

13. Disposal considerations

A. Method of disposal Not available.

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

National regulations

KSSTDG

A. UN number Not regulated as dangerous goods.

B. UN proper shipping name Not regulated as dangerous goods.

C. Transport hazard class(es)

Class Not assigned.

Subsidiary risk -

D. Packing group -

E. Environmental hazards

Marine pollutant No.

EmS Not assigned.

F. Special precautions for user Not assigned.

International regulations

IATA

A. UN number Not regulated as dangerous goods.

B. UN proper shipping name Not regulated as dangerous goods.

C. Transport hazard class(es)

Class Not assigned.

Subsidiary risk -

D. Packing group -

E. Environmental hazards No.

F. Special precautions for user Not assigned.

IMDG

A. UN number Not regulated as dangerous goods.

B. UN proper shipping name Not regulated as dangerous goods.

C. Transport hazard class(es)

Class Not assigned.

Subsidiary risk -

D. Packing group -

E. Environmental hazards

Marine pollutant	No.
EmS	Not assigned.
F. Special precautions for user	Not assigned.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not available.

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)
Tin (CAS 7440-31-5)
Nickel (CAS 7440-02-0)

Harmful Substances Requiring Special Medical Examination

Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)

Workplace Environmental Monitoring Harmful Materials

Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)

Occupational Exposure Limit

Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)

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

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)
Iron (CAS 7439-89-6)
Nickel (CAS 7440-02-0)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

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

Nickel (CAS 7440-02-0)

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	Not available.
B. Issue date	11-02-2018
C. Number of revisions and date of most recent revision	04-09-2024 (03 revision)
D. Other	Revised information in Section 16.
Further information	Transportation Emergency Call Chemtrec at: US: 800.424.9300 International: 703.741.5970 Spain: 900.868.538 Switzerland: 0800.564.402 Chemtrec's toll free, mobile-enabled number in Germany – 0800 1817059 South Korea Toll-free Number – 080-880-0468
Disclaimer	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.
Revision information	Product and Company Identification: Synonyms Physical & Chemical Properties: Multiple Properties Transport Information: Material Transportation Information