MATERION

MATERIAL SAFETY DATA SHEET

1. Chemical product and company identification

A. Product name **Copper Beryllium Wrought Alloy**

Other means of identification

SDS number A10

Synonym(s) Beryllium Copper, Copper Beryllium, BeCu, CuBe, Alloy 10, Alloy 10X (C17500); Alloy 165 (17000); Alloy 170; Alloy 171 (C17450), Alloy C717 (C71700), Brush 60®, BrushForm® 47, BrushForm® 65 (C17460); Alloy 174 (C17400), (C17410), (C17420); Alloy 25, Alloy 190, BrushForm® 290 (C17200); Alloy 3 (C17510); Alloy 310; Alloy 390®; Alloy 390E, MoldMAX®, PROtherm®, WeldPak®, EtchMet™, Alloy 172

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 Manufacture of fabricated metal products, except machinery and 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 1.800.862.4118

2. Hazards identification

A. Hazard category/Classification

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

B. Warning label items including precautionary statement

• Pictogram

• Signal word Danger

• Hazard statement

H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H350	May cause cancer.
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.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing should not be allowed out of the workplace.
P285	In case of inadequate ventilation wear respiratory protection.

Response

P302 + P350	If on skin: Wash with plenty of water.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P308 + P311	If exposed or concerned: Call a poison center/doctor.
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 related regulations).

C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard)

None known.

Supplemental information

Exposure to the elements listed in Section 3 by inhalation, ingestion, and skin contact can occur when melting, casting, dross handling, pickling, chemical cleaning, heat treating, abrasive cutting, welding, grinding, sanding, polishing, milling, crushing, or otherwise heating or abrading the surface of this material in a manner which generates particulate.

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	96.3 - 99.5
Cobalt		7440-48-4	KE-06060	0 - 2.7
Nickel		7440-02-0	KE-25818	0 - 2.2
Beryllium		7440-41-7	KE-02829	0.15 - 2
Zirconium		7440-67-7	KE-35607	0 - 0.3

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. Get medical attention if symptoms persist.

B. In case of skin contact

Take off contaminated clothing and wash before reuse. 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

If symptoms develop move victim to fresh air. For breathing difficulties, oxygen may be necessary. 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

If swallowed, seek medical advice immediately and show this container or label. Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

E. Note to physician	Treatment of Chronic Beryllium Disease: There is no known treatment which will cure chronic beryllium disease. Prednisone or other corticosteroids are the most specific treatment currently available. They are directed at suppressing the immunological reaction and can be effective in diminishing signs and symptoms of chronic beryllium disease. In cases where steroid therapy has had only partial or minimal effectiveness, other immunosuppressive agents, such as cyclophosphamide, cyclosporine, or methotrexate, have been used. In view of the potential side effects of all the immunosuppressive medications, including steroids such as prednisone, they should be used only under the direct care of a physician. Other treatment, such as oxygen, inhaled steroids or bronchodilators, may be prescribed by some physicians and can be effective in selected cases. In general, treatment is reserved for cases with significant symptoms and/or significant loss of lung function. The decision about when and with what medication to treat is a judgment situation for individual physicians. In their 2014 official statement on the Diagnosis and Management of Beryllium Sensitivity and Chronic Beryllium Disease, the American Thoracic Society states that “it seems prudent for workers with BeS to avoid all future occupational exposure to beryllium.”
Most important symptoms/effects, acute and delayed	May cause allergic skin reaction. May cause allergic respiratory reaction. Prolonged exposure may cause chronic effects.
General advice	If exposed or concerned: get medical attention/advice. Get medical attention if symptoms occur. Wash contaminated clothing before reuse. As supplied, there is no immediate medical risk with beryllium products in article form. First aid measures provided are related to particulate containing beryllium.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	The product is non-combustible. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions.
B. Specific hazards arising from the chemical (example: hazardous combustion products)	Not available.

C. Specific methods of fire-fighting

Special protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus. Wear suitable protective equipment.
Special fire fighting procedures	Move containers from fire area if you can do so without risk. Water runoff can cause environmental damage.
Specific methods	Pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the particulate released during or after a fire.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency measures	In solid form this material poses no special clean-up problems. Wear appropriate protective equipment and clothing during clean-up.
B. Environmental precautions	Avoid release to the environment. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. 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	Clean up in accordance with all applicable regulations.

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. Minimize dust generation and accumulation. Do not breathe dust/fume. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection. Wash thoroughly after handling. When using, do not eat, drink or smoke. Contaminated work clothing must not be allowed out of the workplace.
B. Conditions for safe storage (including any incompatibilities)	Keep locked-up. Avoid contact with acids and alkalies. Avoid contact with oxidizing agents.

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
Beryllium (CAS 7440-41-7)	STEL	0.01 mg/m3	
	TWA	0.002 mg/m3	
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	
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	
Zirconium (CAS 7440-67-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	

US. ACGIH Threshold Limit Values (TLV)

Components	Type	Value	Form
Beryllium (CAS 7440-41-7)	TWA	0.00005 mg/m3 (as beryllium)	Inhalable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	Inhalable fraction.
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Zirconium (CAS 7440-67-7)	TWA	5 mg/m3	

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.

Exposure guidelines

Korea OELs: Skin designation

Beryllium (CAS 7440-41-7) — Substance can be absorbed through membrane, eye and skin and can cause whole body effects (It does not mean skin irritant).

B. Appropriate engineering controls — Follow standard monitoring procedures.

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** — Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities. Skin contact with this material may cause, in some sensitive individuals, an allergic dermal response. Particulate that becomes lodged under the skin has the potential to induce sensitization and skin lesions.

Hygiene measures — Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

A. Appearance

Physical state	Solid.
Form	Various shapes.
Color	Copper.
B. Odor	Not applicable.
C. Odor threshold	Not applicable.
D. pH	Not applicable.

E. Melting point/freezing point

Melting point	> 1600 - < 1960 °F (> 871.11 - < 1071.11 °C)
Freezing point	Not applicable.
F. Boiling point, initial boiling point, and boiling range	4474.4 °F (2468 °C) estimated Not applicable.
G. Flash point	Not applicable.
H. Evaporation rate	Not applicable.
I. Flammability (solid, gas)	Not available.

J. Upper/lower limit on flammability or explosive limits

Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
K. Vapor pressure	0.77 hPa estimated

L. Solubility

Solubility (water)	Not applicable.
M. Vapor density	Not applicable.
N. Specific gravity	8.8 estimated
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
Flammability	Not applicable.
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 oxidizing agents.
D. Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure

• Respiratory organs	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
• Skin	May cause an allergic skin reaction.
• Eyes	Not likely, due to the form of the product.

• Mouth	Not likely, due to the form of the product.

B. Information on health hazards

• Acute toxicity (list all possible routes of exposure)	May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.
• 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 allergy or asthma symptoms or breathing difficulties if inhaled.
• Skin sensitization	May cause an allergic skin reaction.
• Carcinogenic properties /Carcinogenicity	May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Beryllium (CAS 7440-41-7)	1 Carcinogenic to humans.
Cobalt (CAS 7440-48-4)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic 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	May cause damage to organs (respiratory system) through prolonged or repeated exposure.
• Aspiration hazard	Not an aspiration hazard.

12. Ecological information

A. Ecotoxicity 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.

Product		Species	Test Results
Copper Beryllium Wrought Alloy			
Aquatic			
Acute			
Fish	LC50	Fish	0.0317 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

Hazardous to the aquatic environment, acute hazard	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.
B. Persistence/degradability	No data is available on the degradability of this product.
C. Bioaccumulative potential	No data available.
D. Mobility in soil	No data available for this product.

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. 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	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	UN3178
B. UN proper shipping name	Flammable solid, inorganic, n.o.s.
C. Transport hazard class(es)	
Class	4.1
Subsidiary risk	-
D. Packing group	III
E. Environmental hazards	No.
ERG Code	3L
F. Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

A. UN number	UN3178
B. UN proper shipping name	FLAMMABLE SOLID, INORGANIC, N.O.S.
C. Transport hazard class(es)	
Class	4.1
Subsidiary risk	-
D. Packing group	III
E. Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-G
F. Special precautions for user	Read safety instructions, MSDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

IATA; IMDG

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

Beryllium (CAS 7440-41-7)

Controlled Hazardous Substances

Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)

Harmful Substances Requiring Special Medical Examination

Beryllium (CAS 7440-41-7)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)

Workplace Environmental Monitoring Harmful Materials

Beryllium (CAS 7440-41-7)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)

Occupational Exposure Limit

Beryllium (CAS 7440-41-7)
Cobalt (CAS 7440-48-4)
Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)
Zirconium (CAS 7440-67-7)

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

Beryllium (CAS 7440-41-7)
Copper (CAS 7440-50-8)
Nickel (CAS 7440-02-0)

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

Beryllium (CAS 7440-41-7)
Nickel (CAS 7440-02-0)

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

A. Source of information

NLM: Hazardous Substances Data Base
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. Non-Toxic Chemicals List (National Institute of Environment Research (NIER) Public Notice No. 1997-10, as amended)
Korea. Observational Chemicals (Ministerial Decree of TCCL Article 6)
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)

B. Issue date 06-23-2015

C. Number of revisions and date of most recent revision 11-14-2023 (06 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
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Revision information	Product and Company Identification: Synonyms Physical & Chemical Properties: Multiple Properties Other information: Further information