MATERION

SAFETY DATA SHEET

1. Identification

Name of the substance or mixture (trade name)	**Copper Beryllium Wrought Alloy**
Synonyms	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
SDS No.	A10
Major recommended uses for the substance or mixture	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
Specific restrictions for use of the substance or mixture	Professional uses: Public domain (administration, education, entertainment, services, craftsmen) Professional uses: Public domain (administration, education, entertainment, services, craftsmen) Casting, grinding or polishing of beryllium-containing alloys by artists; Casting, grinding or polishing of beryllium-containing alloys for dental crowns, appliances or prosthetics; Casting, grinding or polishing of beryllium-containing alloys for jewelry.

Manufacturer/Importer/Distributor information

Manufacturer

Company name	Materion Brush Inc.
Address	6070 Parkland Boulevard Mayfield Heights, OH 44124 United States
Telephone	+1.216.383.4019
Website	www.materion.com
E-mail	ehs@materion.com
Emergency telephone number	+1.216.383.4019

2. Hazards identification

Classification of the substance or mixture

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

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

GHS labeling elements, including precautionary statements

Hazard symbol(s)

Signal word Danger

Hazard statement(s) May cause cancer by inhalation. May cause allergic skin reaction. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs (respiratory system) through prolonged or repeated exposure.

Precautionary statement(s)

Prevention 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. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection. In case of inadequate ventilation wear respiratory protection.

Response If on skin: Wash with plenty of water. If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Call a poison center/doctor. If skin irritation or rash occurs: Get medical advice/attention. If experiencing respiratory symptoms: Call a poison center/doctor. Wash contaminated clothing before reuse.

Storage Store locked up.

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

Other hazards which do not result in classification 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

Mixture

Common chemical name or technical name	CAS number	Concentration or concentration range
Copper	7440-50-8	96.3 - 99.5
Cobalt	7440-48-4	0 - 2.7
Nickel	7440-02-0	0 - 2.2
Beryllium	7440-41-7	0.15 - 2
Other components below reportable levels		≤ -3.2

4. First-aid measures

First-aid measures

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.

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.

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.

Ingestion 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.

Most important symptoms/effects, acute and delayed	May cause allergic skin reaction. May cause allergic respiratory reaction. Prolonged exposure may cause chronic effects.
Personal protection for first-aid responders	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.
Notes 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.”

5. Fire-fighting measures

Means of fire extinguishing

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.
Specific hazards arising from the chemical	Not available.
Special fire fighting procedures	Move containers from fire area if you can do so without risk. Water runoff can cause environmental damage.
Protective measures taken by firefighting crews	Firefighters should wear full protective clothing including self contained breathing apparatus. Wear suitable protective equipment.
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. Control measures for spills and leaks

Personal precautions, protective equipment and emergency procedures

To be taken by those who are not involved in rendering emergency services	Wear appropriate personal protective equipment.
To be taken by those who are involved in rendering emergency services	Not available.
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.
Methods and materials for containment and cleaning up	Clean up in accordance with all applicable regulations.
Other issues relating to spills and releases	Clean up in accordance with all applicable regulations.

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. 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.

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

Control parameters

VENTILATION: 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.

Ensure adequate ventilation, especially in confined areas.
Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate. Where utilized, exhaust inlets to the ventilation system must be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users. Use qualified professionals to design and install ventilation systems.

WET METHODS: Machining operations are usually performed under a liquid lubricant/coolant flood which assists in reducing airborne particulate. However, the cycling through of machine coolant containing finely divided particulate in suspension can result in the concentration building to a point where the particulate may become airborne during use. Certain processes such as sanding and grinding may require complete hooded containment and local exhaust ventilation. Prevent coolant from splashing onto floor areas, external structures or operators' clothing. Utilize a coolant filtering system to remove particulate from the coolant.

WORK PRACTICES: Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. If work practices and/or procedures are ineffective in controlling airborne exposure or visual particulate from deposition on skin, hair, or clothing, provide appropriate cleaning/washing facilities. Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker. Never use compressed air to clean work clothing or other surfaces.

Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, clean loose particulate from parts between processing steps. As a standard hygiene practice, wash hands before eating or smoking.

HOUSEKEEPING: Use vacuum and wet cleaning methods for particulate removal from surfaces. Be certain to de-energize electrical systems, as necessary, before beginning wet cleaning. Use vacuum cleaners with high efficiency particulate air (HEPA). Do not use compressed air, brooms, or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. Follow the manufacturer's instructions when performing maintenance on HEPA filtered vacuums used to clean hazardous materials.

Occupational exposure limits

Brazil. OELs (Ordinance No. 3214, 6/8/78, NR-15, Annex 11 (supplemented with ACGIH))

Components	Type	Value	Form
Beryllium (CAS 7440-41-7)	TWA	0.00005 mg/m3	Inhalable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	Inhalable fraction.

Brazil. OELs (Ordinance No. 3214, 6/8/78, NR-15, Annex 11 (supplemented with ACGIH))

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.

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.

Biological limit values

Brazil. BEIs (Ordinance No. 3214, 6/8/78, NR-07, Table 1)

Components	Value	Determinant	Specimen	Sampling Time
Cobalt (CAS 7440-48-4)	15 µg/l	Cobalto	Urine	*

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

Appropriate engineering controls Ensure adequate ventilation, especially in confined areas.

Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate. Where utilized, exhaust inlets to the ventilation system must be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users. Use qualified professionals to design and install ventilation systems.

Personal protective measures

Eyes and face 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.

Skin protection

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

Other 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.

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.

Thermal hazards Not applicable.

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

9. Physical and chemical properties

Appearance

Physical state Solid.

Form Various shapes.

Color Copper.

Odor Not applicable.

Odor threshold Not applicable.

pH Not applicable.

Melting point/freezing point	> 1600 - < 1960 °F (> 871.11 - < 1071.11 °C) / Not applicable.
Initial boiling point and boiling temperature range	4474.4 °F (2468 °C) estimated
	Not applicable.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
Vapor pressure	0.77 hPa estimated
Vapor density	Not applicable.
Relative density	Not applicable.
Solubility(ies)	
Solubility (water)	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not applicable.
Viscosity	Not applicable.
Other physical and chemical parameters	
Density	8.80 g/cm3 estimated
Flammability	Not applicable.
Specific gravity	8.8 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. Hazardous polymerization does not occur.
Conditions to avoid	Avoid dust formation. Contact with acids. Contact with alkalis.
Incompatible materials	Strong acids, alkalies and oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause damage to organs (respiratory system) through prolonged or repeated exposure.
Skin contact	May cause an allergic skin reaction.
Eye contact	Not likely, due to the form of the product.
Ingestion	Not likely, due to the form of the product.
Symptoms	Respiratory disorder.
Acute toxicity	Based on available data, the classification criteria are not met.
Skin irritation and corrosion	Not likely, due to the form of the product.
Serious eye damage/eye irritation	Not likely, due to the form of the product.

Respiratory or skin sensitization

ACGIH sensitization

Cobalt and inorganic compounds, inhalable fraction, as Co (CAS 7440-48-4)	Dermal sensitization
	Respiratory 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 Due to lack of data the classification is not possible.

Carcinogenicity Cancer hazard.

ACGIH Carcinogens

Cobalt (CAS 7440-48-4)	A2 Suspected human carcinogen.

Brazil. OELs (Ordinance No. 3214, 6/8/78, NR-15, Annex 11 (amended through ACGIH))

Beryllium (CAS 7440-41-7)	Group A1 Confirmed human carcinogen.
Cobalt (CAS 7440-48-4)	Group A3 Confirmed animal carcinogen with unknown relevance to humans.
Nickel (CAS 7440-02-0)	Group A5 Not suspected as a human carcinogen.

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.

Toxic to reproduction Not classified.

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 by inhalation.

Aspiration hazard Due to lack of data the classification is not possible.

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

Other information Symptoms may be delayed.

12. Ecological information

Ecotoxicity

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

* 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

Partition coefficient n-octanol / water (log Kow)	Not available.
Bioconcentration factor (BCF)	Not available.

Mobility in soil Not available.

Other adverse effects Not available.

13. Considerations on final disposal

Recommended methods for final destination

Residual waste 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 Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

Local disposal regulations Material should be recycled if possible. Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

14. Transport information

National regulations

ANTT

Not regulated as dangerous goods.

International regulations

IATA

UN number UN3178

UN proper shipping name Flammable solid, inorganic, n.o.s.

Transport hazard class(es)

Class 4.1

Subsidiary risk -

Packing group III

Environmental hazards No.

ERG Code 3L

Special precautions for user Not assigned.

Other information

Passenger and cargo aircraft Allowed with restrictions.

Cargo aircraft only Allowed with restrictions.

IMDG

UN number UN3178

UN proper shipping name FLAMMABLE SOLID, INORGANIC, N.O.S.

Transport hazard class(es)

Class 4.1

Subsidiary risk -

Packing group III

Environmental hazards

Marine pollutant No.

EmS F-A, S-G

Special precautions for user Not assigned.

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

IATA; IMDG

15. Regulatory information

Federal regulations

Chemical Products Controlled by the Federal Police (Ordinance No. 240)

Not applicable.

Chemical Products for the Manufacture and Synthesis of Narcotics and Psychotropic Subject to Control of the Ministry of Justice (Resolution No. 169 of 15 August 2017, Annex I, List D2)

Not listed.

Controlled products that must be reported to the Army (Decree No. 3655, Annex 1, as amended)

Not applicable.

Ozone depleting substances (Decree No. 99.280, Annexes A, B, C and E, as amended)

Not applicable.

POPs (Decree No. 5.472 promulgates the Stockholm Convention on persistent organic pollutants)

Not listed.

Use and physiological effects of chemical products (Decree No. 3665, Annex 3)

Not applicable.

International regulations

Montreal Protocol

Not applicable.

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto protocol

Not applicable.

Basel Convention

Not applicable.

16. Other information

Significant information, yet not specifically related to the previous sections	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
Legends and abbreviations	Not available.
Revision information	Product and Company Identification: Synonyms Other information: Significant information, yet not specifically related to the previous sections

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