1. Chemical and company identification

Name of chemical (Product name)	**Copper Beryllium Alloy By Products**
Company name	Materion Brush Inc.
Address	6070 Parkland Boulevard Mayfield Heights, OH 44124 United States
Contact person	Theodore Knudson
Telephone	1.216.383.4019
e-mail address	ehs@materion.com
Emergency telephone number	1.216.383.4019
Reference number	A24

2. Hazards identification

GHS classification

Physical hazards	The product is not classified according to GHS.	
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, inhalation	Category 4
	Sensitization, respiratory	Category 1
	Sensitization, skin	Category 1A
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 1A
	Specific target organ toxicity, single exposure	Category 1 (digestive system)
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure	Category 2 (immune system, kidney, respiratory system)
Environmental hazards	The product is not classified according to GHS.	

GHS label elements

Symbols

Signal words Danger

Hazard statement Toxic if swallowed. Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Suspected of causing genetic defects. May cause cancer. Causes damage to organs. May cause respiratory irritation. May cause damage to organs through prolonged or repeated exposure.

Precautionary statement

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 should 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 experiencing respiratory symptoms: Call a poison center/doctor. If skin irritation or rash occurs: Get medical advice/attention. 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 For further information, please contact the Product Stewardship Department at +1.216.383.4019.

Main symptoms and emergency overview

Main symptoms May cause respiratory irritation. May cause an allergic skin reaction. Prolonged exposure may cause chronic effects.

Emergency overview Toxic if swallowed. Causes damage to organs. Cancer hazard. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction. Danger of serious damage to health by prolonged exposure. Possible reproductive hazard. Suspected of causing genetic defects.

3. Composition/information on ingredients

Substance or mixture Mixture

		Gazette notification		
Components	**CAS Number**	**ENCS no.**	**ISHL no.**	**Concentration (%)**
Copper	7440-50-8			65 - 90
Copper Oxides (mixed)	Not Applicable			5 - 15
Durasoil	Trade Secret			2 - 4
Beryllium	7440-41-7			0.1 - 2
Aluminum	7429-90-5			0.1 - 1
Aluminum Oxides (mixed)	Not Applicable			0.1 - 1
Beryllium Oxides (mixed)	Not Applicable			0.1 - 1
Cobalt	7440-48-4			0.1 - 1
Cobalt Oxides (mixed)	Not Applicable			0.1 - 1
Nickel	7440-02-0			0.1 - 1
Nickel Oxides (mixed)	Not Applicable			0.1 - 1
Silica	14808-60-7	(1)-548	(1)-548	0.1 - 1
Zirconium	7440-67-7			0.1 - 1

Synonym(s) Beryllium Copper Alloy By Products, Copper Beryllium Alloy Dross

Chemical formula Cu (7440-50-8), Be (7440-41-7), O2Si (14808-60-7), Al (7429-90-5), Ni (7440-02-0), Co (7440-48-4), Zr (7440-67-7)

4. First aid measures

If inhaled 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.

If on skin 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.

If in eyes Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention if symptoms persist.

If swallowed 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.

Protection of 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.” The effects of continued low exposure to beryllium are unknown for individuals who are sensitized to beryllium or who have a diagnosis of chronic beryllium disease. It is generally recommended that persons who are sensitized to beryllium or who have CBD terminate their occupational exposure to beryllium.

5. Fire-fighting measures

Extinguishing media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product is non-combustible.
Extinguishing media to avoid	Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions.
Special fire fighting procedures	Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers. Water runoff can cause environmental damage.
Protection of fire-fighters	Firefighters should wear full protective clothing including self contained breathing apparatus. Wear suitable protective equipment.
General fire hazards	No unusual fire or explosion hazards noted.
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

Personal precautions, protective equipment and emergency measures	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. For personal protection, see section 8 of the SDS. Avoid contact with skin or inhalation of spillage, dust or vapor. Avoid generation and spreading of dust. Ensure suitable personal protection (including respiratory protection) during removal of spillages in a confined area.
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 or materials for containment and cleaning up	The product is immiscible with water and will spread on the water surface. Clean up in accordance with all applicable regulations. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.

7. Handling and storage

Handling

Technical measures (e.g. Local and general ventilation)	No specific recommendations.
Safe handling advice	Observe good industrial hygiene practices.
Contact avoidance measures	Strong oxidizing agents. For further information, please refer to section 10 of the SDS.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice.

Storage

Safe storage conditions	Store away from incompatible materials (see Section 10 of the SDS).
Safe packaging materials	Store in original tightly closed container.

8. Exposure controls/personal protection

Occupational exposure limits

Japan. OELs - ISHL. (Workplace Environment Assessment Standards)

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TLV	0.025 mg/m3	Dust.
Beryllium (CAS 7440-41-7)	TLV	0.001 mg/m3	
Cobalt (CAS 7440-48-4)	TLV	0.02 mg/m3	
Nickel (CAS 7440-02-0)	TLV	0.1 mg/m3	

Japan. OELs - JSOH (Japan Society of Occupational Health: Recommendation of Occupational Exposure Limits)

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	2 mg/m3	Total dust.
		0.5 mg/m3	Respirable dust.
Beryllium (CAS 7440-41-7)	TWA	0.002 mg/m3	
Cobalt (CAS 7440-48-4)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1 mg/m3	
Silica (CAS 14808-60-7)	Ceiling	0.03 mg/m3	Respirable dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Beryllium (CAS 7440-41-7)	TWA	0.00005 mg/m3 (as beryllium)	Inhalable fraction.
Cobalt (CAS 7440-48-4)	TWA	0.02 mg/m3	
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.
Silica (CAS 14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.
Zirconium (CAS 7440-67-7)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Biological limit values

Japan. BELs - JSOH (Japan Society of Occupational Health: Recommendation of Occupational Exposure Limits Based on Biological Monitoring)

Components	Value	Determinant	Specimen	Sampling Time
Cobalt (CAS 7440-48-4)	35 µg/l	Cobalt	Urine	*
	3 µg/l	Cobalt	Blood	*

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

ACGIH Biological Exposure Indices

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

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

Engineering measures

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 equipment

Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. 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.
Hand protection	Wear appropriate chemical resistant gloves. Wear gloves to prevent contact with particulate or solutions. Wear gloves to prevent metal cuts and skin abrasions during handling.
Eye protection	Wear safety glasses with side shields (or goggles). 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 and 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.

9. Physical and chemical properties

Appearance

Physical state	Solid.
Form	Solid. Various shapes.
Color	Reddish-brown
Odor	None.
Odor threshold	Not applicable.
pH	Not applicable.
Melting point/Freezing point	1750 - 2000 °F (954.44 - 1093.33 °C) / Not applicable.
Boiling point, initial boiling point, and boiling range	Not applicable.
Flash point	Not applicable.
Combustion characteristics (solid, gas)	None known.

Upper/lower flammability or explosive limits

Explosive limit - lower (%)	Not applicable.
Explosive limit - upper (%)	Not applicable.
Vapor pressure	Not applicable.
Vapor density	Not applicable.
Evaporation rate	Not applicable.
Specific gravity	7.74 Not applicable.

Solubility(ies)

Solubility (water)	Insoluble.
Solubility (other)	Not applicable.
Partition coefficient (n-octanol/water)	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not applicable.
Viscosity (Coefficient of viscosity)	Not applicable.

Other information

Density	0.25 - 0.33 lb/in³

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.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials. 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

Acute toxicity	May cause allergy or asthma symptoms or breathing difficulties if inhaled. Not known. May cause allergic respiratory reaction.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

ACGIH sensitization

BERYLLIUM AND COMPOUNDS, SOLUBLE AND INSOLUBLE COMPOUNDS, AS BE, INHALABLE FRACTION (CAS 7440-41-7)	Respiratory sensitization
HARD METALS CONTAINING COBALT AND TUNGSTEN CARBIDE, THORACIC FRACTION, AS CO (CAS 7440-48-4)	Respiratory sensitization

Japan Society for Occupational Health: Respiratory sensitizer

Beryllium (CAS 7440-41-7)	1 Known respiratory sensitizer.
Cobalt (CAS 7440-48-4)	1 Known respiratory sensitizer.
Nickel (CAS 7440-02-0)	2 Probable respiratory sensitizer.

Japan Society for Occupational Health: Skin sensitizer

Beryllium (CAS 7440-41-7)	2 Probable skin sensitizer.
Cobalt (CAS 7440-48-4)	1 Known skin sensitizer.
Copper (CAS 7440-50-8)	2 Probable skin sensitizer.
Nickel (CAS 7440-02-0)	1 Known skin sensitizer.

Respiratory sensitization	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin sensitization	May cause sensitization by skin contact.
Germ cell mutagenicity	May cause genetic defects.

Carcinogenicity

ACGIH Carcinogens

Aluminum (CAS 7429-90-5)	A4 Not classifiable as a human carcinogen.
Beryllium (CAS 7440-41-7)	A1 Confirmed human carcinogen.
Cobalt (CAS 7440-48-4)	A2 Suspected human carcinogen. A3 Confirmed animal carcinogen with unknown relevance to humans.
Nickel (CAS 7440-02-0)	A5 Not suspected as a human carcinogen.
Silica (CAS 14808-60-7)	A2 Suspected human carcinogen.
Zirconium (CAS 7440-67-7)	A4 Not classifiable 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.
Silica (CAS 14808-60-7)	1 Carcinogenic to humans.

Japan Society for Occupational Health: Carcinogen

Beryllium (CAS 7440-41-7)	1 Carcinogenic to humans.
Cobalt (CAS 7440-48-4)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	1 Carcinogenic to humans.
Silica (CAS 14808-60-7)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Beryllium (CAS 7440-41-7)	Known To Be Human Carcinogen.
Cobalt (CAS 7440-48-4)	Reasonably Anticipated to be a Human Carcinogen.
Nickel (CAS 7440-02-0)	Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen.
Silica (CAS 14808-60-7)	Known To Be Human Carcinogen.

Reproductive toxicity May cause harm to breastfed babies.

Specific target organ toxicity - single exposure May cause damage to organs.

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

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.

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

Bioaccumulation No data available.

Mobility in soil The product is immiscible with water and will spread on the water surface.

Hazardous to the ozone layer No data available.

Other hazardous 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

Dispose in accordance with all applicable regulations.

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 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 Contract with a disposal operator licensed by the Law on Disposal and Cleaning. When your own wastewater treatment plant is not available, collect entire waste and then charge to a licensed industrial waste management professional with manifests for industrial waste. 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

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

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

National regulations Follow regulation in section 15 for domestic transportation.

15. Regulatory information

Industrial Safety and Health Act

Specified substances regulation

Class 1 designated chemical substances

BERYLLIUM AND ITS COMPOUNDS

Class 2 designated chemical substances

COBALT

Cobalt and its inorganic compounds

NICKEL COMPOUNDS (POWDER, EXCLUDING NICKEL CARBONYL (ITEM NO. 24))

Notifiable substances

BERYLLIUM AND ITS COMPOUNDS	Table 9 Ordinance No. VI	0.10 - 2.0 %
COBALT AND COBALT COMPOUNDS	Table 9 Ordinance No. 172	0.10 - 1.0 %
COPPER AND COPPER COMPOUNDS	Table 9 Ordinance No. 379	65 - 90 %
CRYSTALLINE SILICA	Table 9 Ordinance No. 165-2	0.10 - 1.0 %
NICKEL	Table 9 Ordinance No. 418	0.10 - 1.0 %

Labeling substances

BERYLLIUM AND ITS COMPOUNDS	0.10 - 2.0 %
COBALT (POWDER)	0.10 - 1.0 %
COBALT AND COBALT COMPOUNDS	0.10 - 1.0 %
COPPER (POWDER)	65 - 90 %
COPPER AND COPPER COMPOUNDS	65 - 90 %
CRYSTALLINE SILICA	0.10 - 1.0 %

Poisonous and Deleterious Substances Control Act

Specified poisonous substances

Not regulated.

Poisonous substances

Not regulated.

Deleterious substances

Not regulated.

Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.

Class I specified chemical substances

Not regulated.

Class II specified chemical substances

Not regulated.

Monitoring chemical substances

Not regulated.

Priority Assessment Chemical Substances (PACs)

Not regulated.

Reporting Exempted Substances

QUARTZ

Law concerning Pollutant Release and Transfer Register

Specified class 1 substances (substance name, ordinance number and content)

BERYLLIUM AND ITS COMPOUNDS	Ordinance No. 394	2.0 %	(Beryllium)
NICKEL COMPOUNDS	Ordinance No. 309	1.0 %	(Nickel)

Class 1 substances (substance name, ordinance number and content)

COBALT AND ITS COMPOUNDS	Ordinance No. 132	1.0 %	(Cobalt)
NICKEL	Ordinance No. 308	1.0 %	(Nickel)

Class 2 substances (substance name, ordinance number and content)

Not regulated.

Ship Safety Law, Dangerous Goods Marine Transport and Storage Rule Not regulated.

Air Law, Enforcement Rule Not regulated.

Explosives Control Act

Not regulated.

Water Pollution Control Act

COPPER

Sewage Act

COPPER AND ITS COMPOUNDS (AS CU)	3 MG/L

16. Other information

Bibliography

ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
Japan Society for Occupational Health, Recommendation of Occupational Exposure Limits
Japan Chemical Industry Association (JCIA) GHS Guideline, June 2012
JIS Z 7252:2014 Classification of chemicals based on “Globally Harmonized System of Classification and Labelling of Chemicals (GHS)”
JIS Z 7253:2012 Hazard communication of chemicals based on GHS - Labelling and Safety Data Sheet (SDS)

Further information

Transportation Emergency
Call Chemtrec at:
Domestic: 800.424.9300
International: 703.527.3887

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Revision information

This document has undergone significant changes and should be reviewed in its entirety.