



## Material Safety Data Sheet

<b>NGK Metals Corporation</b> <b>ENVIRONMENTAL, HEALTH &amp; SAFETY SERVICES</b> 917 US Highway 11 Sweetwater, TN 37874		<b>COPPER BERYLLIUM</b> <b>CASTING ALLOYS</b>	
MSDS Identification Number	Date Issued	Issued By	Emergency Phone Number
<b>B100</b>	March 18, 2009	L. C. Woodside	NGK Metals: 800.523.8268 Chemtrec: 800.424.9300

### I. Product Identification

Chemical Name:	See Section II for alloy designations	Chemical Family:	Metal Alloy
Trade Name:	Copper Beryllium Casting Alloys	Formula:	Alloy composed of varying concentrations of elements listed in Section II.

### II. Hazardous Constituents

Constituent(s)	Nominal percent content of element constituents for Berylco alloy designations shown (UNS alloy number, if applicable, shown in parenthesis)							
	10C (C82000)	14C (C82200)	20C (C82500)	21C (C82510)	165C (C82400)	245C (C82600)	275C (C82800)	Cu-4Be (Master)
Beryllium	0.65	0.45	2.00	2.00	1.70	2.35	2.65	4.00
Cobalt	2.50	-	0.50	1.10	0.25	0.50	0.50	-
Copper	Balance	Balance	Balance	Balance	Balance	Balance	Balance	Balance
Nickel	-	1.80	-	-	-	-	-	-
Density (lb/cu in)	.311	.316	.292	.298	.298	.292	.292	.281
Melting Point (°F)	1855	1840	1575	1575	1650	1575	1575	1590

### III. Regulatory Exposure Information

Constituent(s)	CAS Number	NIOSH RTECS Number	Exposure Limits (as mg/m <sup>3</sup> )*		
			OSHA TWA	CAL/OSHA PEL	ACGIH TLV
Beryllium	7440-41-7	DS1750000	0.002 (TWA); 0.005 (Ceiling); 0.025 (Peak)	0.0002 (PEL) 0.025 (STEL)	0.00005 (TLV) Inhalable particulate matter
Cobalt	7440-48-4	GF8750000	0.1	0.02	0.02
Copper	7440-50-8	GL5325000	Dust: 1.0; Fume: 0.1	Dust: 1.0; Fume: 0.1	Dust: 1.0; Fume: 0.2
Nickel	7440-02-0	QR5950000	1.0	1.0	1.5

\* Many substances do not have a unique exposure limit. The absence of an exposure limit does not lessen consideration for exposure risk. In absence of specific information, professional judgment may be required.

#### IV. SARA Title III Reporting Requirements

Alloy Number	10C (C82000)	14C (C82200)	20C (C82500)	21C (C82510)	165C (C82400)	245C (C82600)	275C (C82800)	Cu-4Be (Master)
Subject to Section 313 reporting	yes	yes	yes	yes	yes	Yes	yes	yes
Elements subject to reporting	Be, Co, Cu	Be, Cu, Ni	Be, Co, Cu	Be, Co, Cu	Be, Co, Cu	Be, Co, Cu	Be, Co, Cu	Be, Cu

#### V. Physical Properties

Freezing Point	Not Applicable	Vapor Pressure (mmHg)	Not Applicable
Melting Point	See Section II	Vapor Density (AIR=1)	Not Applicable
Boiling Point	Not Applicable	Density (H2O=1)	See Section II
Sublimes @	Not Applicable	Solubility in Water	Not Applicable
Evaporation Rate	Not Applicable	% Volatiles by Volume	Not Applicable
Appearance and Odor	Solid - Brass color - No odor		

#### VI. Fire, Explosion and Reactivity Information

Flash Point (with Test Method) None	Flammable (Explosive) Limits V/V% LEL: None UEL: None
Extinguishing Media	This alloy is noncombustible. Use extinguishing media appropriate to the surrounding fire.
Special Fire Fighting Procedures	If this material is reduced to powder form, caution must be used to prevent fire or explosion. To extinguish a metal powder fire use dry sand, dry graphite or other class "D" fire extinguishing powder.
Unusual Fire And Explosion Hazards	No unusual fire or explosion hazards are associated with this material.
General Reactivity	This alloy is a stable material.
Incompatibility (Materials To Avoid)	Avoid contact with mineral acids and oxidizing agents that may generate hydrogen gas; the evolution of hydrogen may be an explosion hazard.
Hazardous Decomposition Products	Various elemental metals and metal oxides may be generated from melting or drop handling operations. Refer to Section III for permissible exposure limits.

## VII. Health Hazard Information

Primary Route(s) of Exposure	<p>INHALATION: Inhalation of metal dust, fume, or powder may result from melting, dross handling, casting, welding, grinding, crushing or similar operation which generate airborne metal particulate during use of this material.</p> <p>INGESTION: Hand, clothing, food and drink contact with metal dust, fume or powder can cause ingestion of particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.</p> <p>SKIN: Skin contact with this material may cause, in some sensitive individuals, an allergic response if elements such as cobalt, copper and nickel are present. In the form of metal dust or powder, skin contact or abrasion may also cause irritation or dermatitis.</p> <p>EYE: Particulate metal (dust, fume or powder) may be dangerous to the eye and surrounding tissue. Airborne particulate (chips, dust or powder) is always a potential problem as well as inserting fingers into the eye socket if the hand or clothing is contaminated with metal particulate.</p>
Toxicity	<p>There is no information on the toxicity of this alloy. Under normal handling and use of the solid form of this material there are few health hazards. Cutting welding, melting, grinding, etc., of this material will produce dust, fume or particulate containing the component elements of this material. Exposure to the dust, fume or particulate may present significant health hazards that are referable to the elemental constituents in Section II.</p>
Effects of Overexposure	<p>ACUTE: The metal dust and fumes of those elements in Section II can cause irritation to the skin, eye and mucous membranes. Contact with cobalt, copper and nickel may cause allergic skin reactions. As dust, powder or fume, exposure, which abrades the skin, can cause irritation and dermatitis. Injury to the eyes is generally a result of particulate irritation or mechanical injury to the cornea or conjunctiva by dust or particulate. Excessive inhalation of cobalt, copper, and nickel can cause respiratory irritation, cough, bronchitis, chills, "fume fever" and asthma-like symptoms.</p> <p>CHRONIC: Respiratory disease with symptoms ranging from shortness of breath and cough to permanent disability due to loss of lung function, fibrosis or subsequent effects on the heart may be caused by excessive exposure to metal dust or fumes containing beryllium, cobalt and nickel. Beryllium and nickel metal and certain compounds have been linked to nasal, bronchial and lung cancers. Inhalation of beryllium in excess concentrations can cause a serious lung disease: berylliosis. Chronic health effects specific to an element (s) may be difficult to detect due to the numerous elemental constituents in this alloy.</p>
Carcinogenic References	<p>Beryllium, nickel and cobalt and some of their compounds have been listed in the 11th Report on Carcinogens as prepared by the National Toxicology Program (NTP) and the International Agency for Research on Cancer (IARC) Monograph Series. Beryllium, nickel, cobalt and some of their compounds are known in the State of California to cause cancer.</p>
Medical Conditions Aggravated By Exposure	<p>Individuals who may have had allergic reaction or sensitivity to metals such as nickel and copper may encounter skin rash or dermatitis if skin contact with this product occurs. Persons with impaired pulmonary function, airway diseases and conditions such as asthma; emphysema, chronic bronchitis, etc. may incur further disability if excessive concentrations of dust or fume are inhaled. If prior damage or disease to the Neurologic (nervous), Circulatory, Hematologic (blood) or Renal (kidney), systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk if handling and use of this material causes excessive exposure.</p>

### VIII. Emergency And First Aid Procedures

Inhalation	Breathing difficulty caused by inhalation of dust or fume requires removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical assistance at once. If over-exposure to metal fume produces chills, muscle aches or fever, move the exposed person to fresh air and obtain medical assistance at once.
Ingestion	Swallowing metal powder or dust can be treated by having the affected person swallow large quantities of water and attempting to induce vomiting if conscious. Obtain medical assistance at once.
Skin	Skin cuts and abrasions can be treated by standard first aid. Skin contamination with dust or powder can be removed by washing with soap and water. If irritation persists obtain medical assistance at once.
Eyes	Dust or powder should be flushed from the eyes with copious amounts of clean water. If irritation persists obtain medical assistance. Contact lenses should not be worn if working with metal dusts and powders.

### IX. Industrial Hygiene Control Measures

Ventilation	Local exhaust ventilation should be used to control exposure to airborne dust and fume whenever possible.	
Respiratory Protection	Use NIOSH approved respirators as specified by an Industrial Hygienist or qualified Safety Professional. Lung function tests are recommended for users of negative pressure devices.	
Protective Gloves	Wear gloves to prevent metal cuts and shin abrasions particularly during handling of wrought forms, solid metal, sheet, strip or tube.	
Eye Protection	Wear safety glasses when risk of eye injury is present particularly during machining, grinding, welding, powder handling, etc.	
Other Protective Equipment	Protective clothing such as uniforms, disposable coveralls, safety shoes, etc. may be required during metal handling operations as appropriate to the circumstances of exposure.	
Recommended Monitoring Procedures	ENVIRONMENTAL SURVEILLANCE: Exposure to the elements identified in Section II can be best determined by having air samples taken in the employee breathing zone, work area or department.	MEDICAL SURVEILLANCE: Lung function tests, chest x-rays and routine physical examinations may be useful to determine effects of dust or fume exposure.

### X. Environmental Protection Information

Steps To Be Taken If Material Is Released Or Spilled	In solid form this material poses no special clean-up problems. If this material is in powder or dust form, clean-up should be conducted with a vacuum system utilizing a high efficiency particulate air filtration system. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Properly label all material collected in waste container.
Waste Disposal Method	Prior to disposal consider if the material has recovery value. State or federal regulations may require specific labeling, packing, storage, transportation and disposal procedures. Contact an Environmental Engineer or consultant familiar with waste disposal regulations.
Environmental Hazards	In solid form this material poses no special environmental problems. Metal powders or dusts may have significant impact on air and water quality. Airborne emissions, spills and releases to the environment (discharge to streams, sewer systems, groundwater, surface soil, etc.) should be controlled immediately. If such potential for spill or release exists it is advisable to develop an emergence spill response plan. Foundries melting beryllium alloys may be subject to the National Emission Standard for Beryllium as promulgated by EPA (40CFR61, subpart C).

## XI. Special Precautions

Handling Precautions	This product must be handled accordingly to the size, shape and quantity of material involved. Solid metal may require use of hoists, cranes, etc. Powders should be moved or transported to minimize spill or release potential.
Storage Precautions	In solid form this material poses no special storage problems. Store metal and metal powder in a dry area. Do not store adjacent to mineral acids. Fine metal powder should be kept away from flames and sources of ignition.

## Additional Information

The following is the label text which accompanies this product during shipment:

**COPPER BERYLLIUM CASTING ALLOYS:**

C82000, C82200, C82500, C82510, C82400, C82600, C82800, Cu-4Be Master

**DANGER! INHALING DUST OR FUME MAY CAUSE SERIOUS LUNG INJURY. SKIN, EYE AND MUCOUS MEMBRANE IRRITATION MAY OCCUR FROM EXPOSURE TO METAL FUME. POTENTIAL CANCER HAZARD.**

- The casting alloy products identified above may contain varying concentrations of the following elements: beryllium, cobalt, copper, and nickel. For specific concentrations of these and other elements present, refer to the Material Safety Data Sheet (MSDS) for these products.
- Inhaling metal dust or fume generated by the use of these alloys may cause adverse health effects such as reduced lung function, nasal and mucous membrane irritation. Inhaling beryllium in excess concentrations can cause a serious lung disease: berylliosis. Exposure to dust or fume generated by the use of these alloys may also cause eye irritation, skin rash and effects of other organ systems.
- Beryllium, nickel and cobalt and some of their compounds are listed in the 11th Report on Carcinogens as prepared by the National Toxicology Program (NTP) as well as the International Agency for Research on Cancer (IARC) Monograph Series. The following information is a summary of findings reported to date:

	Beryllium	Nickel Compounds	Cobalt
NTP Evidence of carcinogenicity	Known	Known	Cobalt Sulfate – Reasonably anticipated
IARC Evidence of carcinogenicity	Known (Group 1)	Known (Group 1)	Possible (Group 2B)

- Use appropriate ventilation controls, personal protective equipment, or both, if the use of this material produces dust or fume.
- For additional information refer to the Material Safety Data Sheet (MSDS) for these alloys. The MSDS is available from NGK Metals Corporation and on the internet at [www.ngkmetals.com/msdsb100.html](http://www.ngkmetals.com/msdsb100.html).

Direct questions concerning Material Safety Data Sheets to:

Manager of Industrial Health & Safety  
NGK METALS CORPORATION  
917 US Highway 11 South  
Sweetwater, TN 37874  
(423) 351-0435  
Facsimile: (423) 337-9798

Additional Information

The information in this document is believed to be correct as of the date issued. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY USE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. This information and the product are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use thereof.