SAFETY DATA SHEET

Copper Beryllium Wrought Alloys

Section 1. Identification

GHS product identifier: **Copper Beryllium Wrought Alloys**

Other means of Identification: **B200**
10(C17500), 10Zr (C17500), 14 (C17510), 25 (C17200), 165 (C17000), 717(C71700)

Supplier/Manufacturer:
NGK Metals Corporation
917 US Highway 11S
Sweetwater, TN 37874
Tel: 423.337.5500
Toll Free: 800.523.8268
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Email: marketing @ngkmetals.com
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Emergency phone Number: NGK Metals (800)523-8268, Chemtrec USA (800)424-9300 International +1 (703)527-3887 CCN15616 24/7

Section 2. Hazard Identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture:
ACUTE TOXICITY (inhalation) - Category 4
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
CARCINOGENICITY - Category 1B
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1

GHS label elements
Hazard pictograms

Signal word : Danger

Hazard statements :
H332 - Harmful if inhaled.
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 - May cause an allergic skin reaction.
H350 - May cause cancer.

H372 – May causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention :
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P281 - Use personal protective equipment as required.
P280 - Wear protective gloves.
P285 - In case of inadequate ventilation wear respiratory protection.
P271 - Use only outdoors or in a well-ventilated area.
P260 - Do not breathe dust.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash hands thoroughly after handling.
P272 - Contaminated work clothing should not be allowed out of the workplace.

Response :
P391 - Collect spillage.
P314 - Get medical attention if you feel unwell.
P308 + P313 - IF exposed or concerned: Get medical attention.
P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or physician.
P302 + P352 + P363 - IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse.
P333 + P313 - If skin irritation or rash occurs: Get medical attention.

Storage :
P405 - Store locked up.

Disposal :
P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified (HNOC) :
None known.

Section 3. Composition/information on ingredients

Substance/mixture: Mixture

Other means of Identification: Copper Beryllium Alloy

CAS number/other identifiers

CAS number: Not applicable

Product code: Not applicable

Ingredient name	%	CAS number
Copper	66-98.1	7440-50-8
Nickel	0 – 30	7440-02-0
Cobalt	0 – 2.5	7440-48-4
Beryllium	0.3 – 2.0	7440-41-7
Zirconium	0 – 0.3	7440-67-7

Section 4. First aid measures

Eye contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. Get medical attention.

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or

oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway.

Skin contact: Wash with plenty of soap and water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Get medical attention for persistent irritation. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion: Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact: No known significant effects or critical hazards.

Inhalation : Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : May cause an allergic skin reaction.

Ingestion : No known significant effects or critical hazards.

Eye contact : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No known significant effects or critical hazards.

Inhalation: Adverse symptoms may include the following: wheezing and breathing difficulties asthma.

Skin contact: Adverse symptoms may include the following: irritation redness

Ingestion: No known significant effects or critical hazards.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Airborne particles of beryllium alloys can, if inhaled to excess, cause irreversible lung damage in people who are sensitive to beryllium. Prevention of this adverse health effect (called berylliosis or, more precisely, chronic beryllium disease) lies in maintaining good air quality.

Chronic beryllium disease is a condition that primarily affects the tissue of the lungs restricting the exchange of oxygen between the lungs and the bloodstream. The disease may manifest itself in various ways; nonproductive cough, fatigue after slight exertion, and chest x-ray changes are typical. It may appear after a long period of latency, an interval sometimes lasting for years, between causative exposure and the onset of illness. There is no cure yet known, but treatment with steroid drugs has succeeded in adding to the comfort of patients and enabling them to sustain a measure of activity.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media: None Known.

Specific hazards arising from the chemical:	Not applicable.
Hazardous thermal decomposition products:	Decomposition products may include the following materials metal oxide/oxides.
Special protective actions for fire-fighters:	No special measures are required.
Special protective equipment for fire-fighters:	Fire-fighters should wear appropriate protective equipment and self contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:	Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders:	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on unsuitable materials. See also the information "For non-emergency personnel".
Environmental precautions:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Collect spillage.

Methods and materials for containment and cleaning up

Spill:	Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures:	Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene:	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures. Remove contaminated clothing and protective equipment before entering eating areas.
Conditions for safe storage including incompatibilities:	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limit
Copper	**ACGIH TLV (United States, 4/2014).** TWA: 1 mg/m³, (Cu) 8 hours. Form: Dusts and mists TWA: 0.2 mg/m³ 8 hours. Form: Fume **OSHA PEL (United States, 2/2013).** TWA: 1 mg/m³ 8 hours. Form: Dusts and mists TWA: 0.1 mg/m³ 8 hours. Form: Fume **NIOSH REL (United States, 10/2013).** TWA: 1 mg/m³, (Cu) 10 hours. Form: Dusts and mists
Nickel	**ACGIH TLV (United States, 4/2014).** TWA: 1.5 mg/m³ 8 hours. Form Inhalable fraction **NIOSH REL (United States, 10/2013).** TWA: 0.015 mg/m³, (Ni) 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 1 mg/m³, (Ni) 8 hours.
Cobalt	**NIOSH REL (United States, 10/2013).** TWA: 0.05 mg/m³, (as Co) 10 hours. Form: Dust and fumes **ACGIH TLV (United States, 4/2014).** TWA: 0.02 mg/m³, (as Co) 8 hours. Form: Inorganic **OSHA PEL (United States, 2/2013).** TWA: 0.1 mg/m³, (as Co) 8 hours.
Beryllium	**ACGIH TLV (United States, 4/2014). Inhalation sensitizer.** TWA: 0.00005 mg/m³, (as Be) 8 hours. Form: Inhalable fraction **OSHA PEL (United States, 5/2017).** STEL: 2 µg/m³ 15 minutes. TWA: 0.2 µg/m³ 8 hours. **NIOSH REL (United States, 10/2013).** CEIL: 0.0005 mg/m³, (as Be)

Mexico

Ingredient name	Exposure limit
Copper	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³, (as Cu) 8 hours. Form: powder and fog LMPE-CT: 2 mg/m³, (as Cu) 15 minutes. Form: powder and fog LMPE-CT: 2 mg/m³, (as Cu) 15 minutes. Form: smoke LMPE-PPT: 0.2 mg/m³, (as Cu) 8 hours. Form: smoke
Nickel	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 1 mg/m³ 8 hours.
Cobalt	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 0.1 mg/m³, (as Co) 8 hours. Form: powder and smoke
Beryllium	**NOM-010-STPS (Mexico, 9/2000).** LMPE-PPT: 0.002 mg/m³, (as berilium) 8 hours.

Appropriate engineering controls: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before

	reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.
Skin protection	
Hand protection:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be based on the task being performed and the risks involved.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed.
Respiratory protection:	Use NIOSH approved respiratory protection as specified by an Industrial Hygienist or qualified safety professional when airborne exposures exceed or have the potential to exceed occupational exposure limits.

Section 9. Physical and chemical properties

Appearance

Physical state	Solid
Color	Copper
Odor	None
Odor threshold	Not applicable
pH	Not applicable
Melting point	1590 – 2010 F
Boiling point	Not applicable
Flash point	Not applicable
Evaporation rate	Not applicable
Flammability (solid, gas)	Not applicable
Lower and upper explosive (flammable) limits	Not applicable
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not applicable
Solubility	Not applicable
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	Not applicable
Viscosity	Not applicable
Volatility	Not applicable
VOC (w/w)	0 % (w/w)

Section 10. Stability and reactivity

Reactivity:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability:	The product is stable.
Possibility of hazardous reactions:	Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid: No specific data.
Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials, acids and alkalis**.**
Hazardous decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity:

Product/ingredient name	Result	Species	Dose	Exposure
Nickel	LC50 Inhalation Dusts and mists LD50 Oral	Rat Rat	10.2 mg/L >9000 mg/kg	1 hours -

Irritation/Corrosion: There is no data available.
Sensitization: May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction.

Carcinogenicity

Classification:

Product/ingredient name	OSHA	IARC	NTP	ACGIH	EPA	NIOSH
Nickel Cobalt Beryllium	- - -	2B 2B 1	Reasonably anticipated to be a human carcinogen. - Known to be a human carcinogen.	A5 A3 A1	- - -	+ None. +

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Beryllium	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Nickel Beryllium	Category 1 Category 1	Not determined Not determined	Not determined Not determined

Aspiration hazard: There is no data available.
Information on the likely routes of exposure: Dermal contact, eye contact, inhalation

Potential acute health effects

Eye contact: No known significant effects or critical hazards.
Inhalation: Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Contact: May cause an allergic skin reaction.
Ingestion: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact: No known significant effects or critical hazards.
Inhalation: Adverse symptoms may include the following: wheezing and breathing difficulties, asthma.
Skin Contact: Adverse symptoms may include the following: irritation, redness
Ingestion: No known significant effects or critical hazards.

Potential delayed effects: Symptoms may be delayed.

Potential chronic health effects

General: May cause damage to organs through prolonged or repeated exposure. Once sensitized, a severe allergic reaction may occur when subsequently exposed. See section 4.

Carcinogenicity: May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity: No known significant effects or critical hazards.

Teratogenicity: No known significant effects or critical hazards.

Developmental effects: No known significant effects or critical hazards.

Fertility effects: No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates:

Route	ATE value
Oral Inhalation (dusts and mists)	7175.7 mg/kg 3.588 mg/L

Section 12. Ecological information

Ecotoxicity: No ecotoxicity data noted for the ingredients in solid metal form.

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

Bioaccumulative potential:l Not available.

Mobility in soil: Not available.

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transportation information

DOT: Not regulated as dangerous goods.

IATA: Not regulated as dangerous goods.

IMDG: Not regulated as dangerous goods.

Special precautions for user: **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations: **United States inventory (TSCA 8b)**: All components are listed or exempted.
Clean Water Act (CWA) 307: Copper; Nickel; Beryllium

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs:) Listed

Clean Air Act Section 602 Class I Substances: Not listed

Clean Air Act Section 602 Class II Substances: Not listed

DEA List I Chemicals (Precursor Chemicals): Not listed

DEA List I Chemicals (Precursor Chemicals): Not listed

SARA 302/304: Not listed

SARA 311/312
Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Nickel	0 – 30	No	No	No	Yes	Yes
Cobalt	0 – 2.5	No	No	No	Yes	Yes
Beryllium	0.3 – 2.0	No	No	No	Yes	Yes

SARA 313

	Product name	CAS number	%
Form R Reporting requirements	Copper Nickel Cobalt Beryllium	7440-50-8 7440-02-0 7440-48-4 7440-41-7	66-98.1 0 – 30 0 – 2.5 0.3 – 2.0
Supplier notification	Copper Nickel Cobalt Beryllium	7440-50-8 7440-02-0 7440-48-4 7440-41-7	66-98.1 0 – 30 0 – 2.5 0.3 – 2.0

State regulation
Massachusetts: The following components are listed: Copper; Nickel; Cobalt; Beryllium
New York : The following components are listed: Copper; Nickel; Beryllium
New Jersey : The following components are listed: Copper; Nickel; Cobalt; Beryllium

Pennsylvania : The following components are listed: Copper; Nickel; Cobalt; Beryllium

California Prop. 65

WARNING: This product can expose you to chemicals including beryllium, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Nickel	Yes.	No.	No.	No.
Cobalt	Yes.	No.	No.	No.
Beryllium	Yes.	No.	Yes.	No.

International lists

National inventory

Australia	All components are listed or exempted.
Canada	All components are listed or exempted.
China	All components are listed or exempted.
Europe	All components are listed or exempted.
Japan	Not determined.
Malaysia	Not determined.
New Zealand	All components are listed or exempted.
Philippines	All components are listed or exempted
Republic of Korea	All components are listed or exempted.
Taiwan	Not determined.

Section 16. Other information

History

Date of issue	**1/18/2019**
Version	**3**

In 2017 OSHA issued a comprehensive occupational and health standard for beryllium. Refer to 29 CFR 1910.1024 Beryllium Standard for requirements under the Occupational Safety and Health Act.

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