



MATERIAL SAFETY DATA SHEET - NO. A10

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Copper Beryllium Wrought Alloy

SYNONYMS Copper Beryllium Alloy
Beryllium Copper Alloy
Copper Alloy

24-HR. EMERGENCY ASSISTANCE

Transportation Emergency

Call Chemtrec at:

Domestic: (800) 424-9300

International: (703) 527-3887

Other Emergency

Call Brush Wellman at: (800) 862-4118

Revised: 01-02-08

Replaces: MSDS A10 (01-26-05)

CHEMICAL FAMILY Alloy

CUSTOMER SERVICE

Brush Wellman Inc.

Product Stewardship Department

17876 St. Clair Avenue

Cleveland, Ohio 44110

Phone: (800) 862-4118

Fax: (216) 383-4091

Websites www.brushwellman.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL COMPOSITION (Percent by Weight)

BRUSH WELLMAN PRODUCT NAME OR ALLOY NUMBER (Copper Development Association UNS Number)										
CONSTITUENTS	CAS Numbers	10 (C17500)	10X, Q-Max® (C17500)	165 (C17000)	170	171 (C17450) Brush 60®, BrushForm® 47, BrushForm® 65, (C17460)	174 (C17400) (C17410) (C17420)	25, 190, BrushForm® 290 (C17200)	3 (C17510)	310
Copper	7440-50-8	96.6 - 97.2	96.3 - 96.9	97.8 - 98.2	97.4 - 97.8	97.4 - 99.4	98.9 - 99.5	97.6 - 98.2	97.2 - 98.4	96.7 - 98
Cobalt	7440-48-4	2.4 - 2.7	2.4 - 2.7	0.2 - 0.35	0.09	--	0.35 - 0.6	0.2 - 0.35	--	0.8 - 1.3
Nickel	7440-02-0	--	--	--	0.25 - 0.45	0.5 - 1.4	--	--	1.4 - 2.2	0.8 - 1.3
Beryllium	7440-41-7	0.4 - 0.7	0.4 - 0.7	1.6 - 1.79	1.9 - 2	0.15 - 0.5	0.15 - 0.5	1.6 - 2	0.2 - 0.6	0.4 - 0.7
Zirconium	7440-67-7	--	0.3	--	--	0 - 0.5	--	--	--	--

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration apply to this product.

NOTE: As used in this Material Safety Data Sheet, the term "particulate" refers to dust, mist, fume, fragments, particles and/or powder.

3. HAZARD IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Metallic product which poses little or no immediate hazard in solid form. See label in Section 16. If the material is involved in a fire; pressure-demand self-contained breathing apparatus and protective clothing must be worn by persons potentially exposed to the airborne particulate during or after a fire.

3.2 POTENTIAL HEALTH EFFECTS

Exposure to the elements listed in Section 2 by inhalation, ingestion, and skin contact can occur when melting, casting, gross 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.

Exposure may also occur during repair or maintenance activities on contaminated equipment such as: furnace rebuilding, maintenance or repair of air cleaning equipment, structural renovation, welding, etc.

Particulate depositing on hands, gloves, and clothing, can be transferred to the breathing zone and inhaled during normal hand to face motions such as rubbing of the nose or eyes, sneezing, coughing, etc.

3.2.1. Inhalation

Particulate containing those elements listed in Section 2 can cause irritation to the nose, throat, lungs, and mucous membranes. Inhalation of this particulate may cause metal fume fever (high temperature, metallic taste, nausea, coughing, general weakness, muscle aches, and exhaustion), bronchitis, chills, decreased pulmonary function, and asthma-like symptoms.

Beryllium: The beryllium in this product is not known to cause acute health effects. Inhaling particulate containing beryllium may cause a serious, chronic lung disease called Chronic Beryllium Disease (CBD) in some individuals. See section 3.2.5 Chronic (long-term health effects).

Cobalt: May cause asthmatic attacks due to allergic sensitization of the respiratory tract. May cause asthma and shortness of breath.

Copper: Inhalation of particulate containing metallic copper can cause ulceration and perforation of the nasal septum.

Nickel: Can cause headaches, dizziness, and difficult breathing. Inhalation of nickel and nickel compounds is associated with nasal and lung damage and cancer. Symptoms may include coughing, sore throat, and shortness of breath.

Zirconium: Inhalation of zirconium compounds may cause pulmonary granulomas.

3.2.2. Ingestion

Ingestion can occur from hand, clothing, food and drink contact with particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.

Beryllium: The health effect of ingestion of beryllium in the form found in this product is unknown.

Cobalt: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause allergic reaction.

Copper: Copper ingestion causes nausea, vomiting, abdominal pain, metallic taste, and diarrhea. Ingestion of large doses may cause stomach and intestine ulceration, jaundice, and kidney and liver damage.

Nickel: Causes gastrointestinal irritation with nausea, vomiting and diarrhea.

Zirconium: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

3.2.3. Skin

Skin contact with this material may cause, in some sensitive individuals, an allergic dermal response. Skin contact may cause irritation. Symptoms include redness, itching and pain.

Beryllium: Particulate that becomes lodged under the skin has the potential to induce sensitization and skin lesions.

Cobalt: Prolonged and/or repeated contact may cause dermatitis.

Copper: Particulate may cause a greenish-black skin discoloration.

Nickel: May cause allergic dermatitis. Nickel is a contact allergen and sensitizer.

3.2.4. Eyes

Exposure may result from direct contact with airborne particulate or contact to the eye with contaminated hands or clothing. Damage can result from irritation or mechanical injury to the eyes by particulate.

Copper: Particulate in the eyes may cause discoloration.

3.2.5. Chronic (long-term health effects)

Beryllium: Inhaling particulate containing beryllium may cause a serious, chronic lung disease called chronic beryllium disease (CBD) in some individuals. Over time lung disease can be fatal. Chronic beryllium disease is a hypersensitivity or allergic condition in which the tissues of the lungs become inflamed. This inflammation, sometimes with accompanying fibrosis (scarring), may restrict the exchange of oxygen between the lungs and the bloodstream. Medical science suggests that CBD may be related to genetic factors.

Cobalt: Repeated exposure may cause allergic respiratory reaction (asthma). Chronic inhalation of particulate may lead to restricted pulmonary function and lung fibrosis (scarring). Chronic ingestion may result in heart damage and/or failure, vomiting, convulsions and thyroid enlargement. Repeated exposure may cause sensitization dermatitis.

Copper: Prolonged or repeated exposure to copper can discolor skin and hair and irritate the skin; may cause mild dermatitis, runny nose, and irritation of the mucous membranes. Repeated ingestion may damage the liver and kidneys. Repeated Inhalation can cause chronic respiratory disease.

Nickel: Prolonged exposure to excessive concentrations of particulate may cause chronic pulmonary disorders. Nickel and certain nickel compounds are considered carcinogenic and noted for producing nasal and lung cancer. Prolonged or repeated skin contact may cause sensitization dermatitis and possible destruction and/or ulceration.

3.2.6. Carcinogenic References

Beryllium: The International Agency for Research on Cancer (IARC) lists beryllium as a Group 1 – Known Human Carcinogen. The National Toxicology Program (NTP) lists beryllium as known to be human carcinogens. The ACGIH lists beryllium as an A1 – Confirmed Human Carcinogen.

IARC lists beryllium as a known human carcinogen (Group 1) and notes that the work environment of workers involved in refining, machining and producing beryllium metal was associated with an increased risk of lung cancer, “the greater excess was in workers hired before 1950 when exposures to beryllium in the work place were relatively uncontrolled and much higher than in subsequent decades”; and “the highest risk for lung cancer being observed among individuals diagnosed with acute beryllium-induced pneumonitis, who represent a group that had the most intense exposure to beryllium.” IARC further noted that “Prior to 1950, exposure to beryllium in working environments was usually very high, and concentrations exceeding 1 mg/m³ [1000 micrograms per cubic meter] were not unusual.”

Cobalt: The International Agency for Research on Cancer (IARC) lists cobalt as a Group 2B – Possibly Carcinogenic to Humans. ACGIH lists elemental cobalt as an A3 – Animal Carcinogen. OSHA lists cobalt as a possible select carcinogen.

Nickel: The International Agency for Research on Cancer (IARC) lists nickel as a Group 2B – Possibly Carcinogenic to Humans. The National Toxicology Program (NTP) lists nickel as reasonably anticipated to be a human carcinogen. The ACGIH lists elemental nickel as an A5 – Not Suspected as a Human Carcinogen and insoluble nickel compounds as an A1 – Confirmed Human Carcinogen.

Zirconium: The ACGIH list zirconium as an A4 – Not Classifiable as a Human Carcinogen.

3.2.7. Medical Conditions Aggravated by Exposure

Persons with impaired pulmonary function, airway diseases, or conditions such as asthma, emphysema, chronic bronchitis, etc. may incur further impairment if particulate is inhaled. If prior damage or disease to the neurologic (nervous), circulatory, hematologic (blood), or urinary (kidney) systems has occurred, proper screening or examinations should be conducted on individuals who may be exposed to further risk where handling and use of this material may cause exposure.

Beryllium: The effects of chronic beryllium disease on the lungs and heart are additive to the effects of other health conditions.

Copper: Persons with pre-existing skin disorders or impaired liver, kidney, or pulmonary function or pre-existing Wilson's disease may be more susceptible to the effects of this material.

Nickel: Skin contact with some nickel compounds in sensitive individuals may cause dermatitis (nickel itch).

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Ecological Information (Section 12)

4. FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

INHALATION: Breathing difficulty caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

INGESTION: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

SKIN: 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.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4.2 NOTE TO PHYSICIANS

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. These latter agents remain investigational. Further, 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. In general, these medications should be reserved for cases with significant symptoms and/or significant loss of lung function. Other symptomatic treatment, such as oxygen, inhaled steroids or bronchodilators, may be prescribed by some physicians and can be effective in selected cases.

The decision about when and with what medication to treat is a judgment situation for individual physicians. For the most part, treatment is reserved for those persons with symptoms and measurable loss of lung function. The value of starting oral steroid treatment, before signs or symptoms are evident, remains a medically unresolved issue.

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

Flash Point	Non-combustible as a solid. No ignition as layer of sub 44 micron particles of copper.
Explosive Limits	Not applicable to solids. No ignition as cloud of sub 44 micron particles of nominal copper.
Extinguishing Media	This material is non-combustible. Use extinguishing media appropriate to the surrounding fire.
Unusual Fire and Explosion Hazards	Do not use water to extinguish fires around operations involving molten metal due to the potential for steam explosions.
Special Fire Fighting Procedures	Pressure-demand self-contained breathing apparatus must be worn by firefighters or any other persons potentially exposed to the metal fumes or dust released during or after a fire.

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

If this material is a particulate, establish a restricted entry zone based on the severity of the spill. Persons entering the restricted zone must wear adequate respiratory protection and protective clothing appropriate for the severity of the spill (see Section 8). Cleanup spills with a vacuum system utilizing a high efficiency

particulate air (HEPA) filtration system followed by wet cleaning methods. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Be careful to minimize airborne generation of particulate and avoid contamination of air and water. Depending upon the quantity of material released into the environment, the incident may be required to be reported to the National Response Center at (800) 424-8802 as well as the State Emergency Response Commission and Local Emergency Planning Committee.

7. HANDLING AND STORAGE

7.1 HANDLING

Particulate may enter the body through cuts, abrasions or other wounds on the surface of the skin. Wear gloves when handling parts with loose surface particulate or sharp edges.

7.2 STORAGE

Store in a dry area.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

8.1 VENTILATION AND ENGINEERING CONTROLS

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.

8.2 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.

To prevent exposure, remove surface scale or oxidation formed on cast or heat treated products in an adequately ventilated process prior to working the surface.

8.3 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.

8.4 RESPIRATORY PROTECTION

When airborne exposures exceed or have the potential to exceed the occupational limits shown in Section 8.13, 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. Exposure to unknown concentrations of particulate requires the wearing of a pressure-demand airline respirator or pressure-demand self-contained breathing apparatus (SCBA). Use pressure-demand airline respirators when performing jobs with high potential exposures such as changing filters in a baghouse air cleaning device.

8.5 OTHER PROTECTIVE EQUIPMENT

Protective overgarments or work clothing must be worn by persons who may become contaminated with particulate during activities such as machining, furnace rebuilding, air cleaning equipment filter changes, maintenance, furnace tending, etc. Contaminated work clothing and overgarments must be managed in a controlled manner to prevent secondary exposure to workers of third parties, to prevent the spread of particulate to other areas, and to prevent particulate from being taken home by workers.

8.6 PROTECTIVE GLOVES

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

8.7 EYE PROTECTION

Wear safety glasses, goggles, face shield, or welder's helmet when risk of eye injury is present, particularly during melting, casting, machining, grinding, welding, powder handling, etc.

8.8 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.

8.9 MAINTENANCE

During repair or maintenance activities the potential exists for exposures to particulate in excess of the occupational standards. Under these circumstances, protecting workers can require the use of specific work practices or procedures involving the combined use of ventilation, wet and vacuum cleaning methods, respiratory protection, decontamination, special protective clothing, and when necessary, restricted work zones.

8.10 WELDING

In accordance with OSHA regulation 29 CFR 1910.252 welding of materials containing beryllium is regulated as follows: Welding or cutting indoors, outdoors, or in confined spaces involving beryllium containing base or filler metals shall be done using local exhaust ventilation and pressure-demand airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by 29 CFR 1910.1000. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

8.11 EXPOSURE CHARACTERIZATION

Determine exposure to airborne particulate by air sampling in the employee breathing zone, work area, and department. Utilize an Industrial Hygienist or other qualified professional to specify the frequency and type of air sampling. Develop and utilize a sampling strategy which identifies the extent of exposure variation and provides statistical confidence in the results. Conduct an exposure risk assessment of processes to determine if conditions or situations exist which dictate the need for additional controls or improved work practices. Make air sample results available to employees.

8.12 MEDICAL SURVEILLANCE

Beryllium: Medical surveillance for beryllium health effects includes (1) skin examination, (2) respiratory history, (3) examination of the lungs, (4) lung function tests (FVC and FEV1), and (5) periodic chest x-ray. In addition, a specialized, specific, immunological blood test, the beryllium blood lymphocyte proliferation test (BLPT), is available to assist in the diagnosis of beryllium related reactions. Individuals who have an abnormal BLPT are normally referred to a lung specialist for additional specific tests to determine if chronic beryllium disease is present. Note: Substantial inter- and intra-laboratory disagreement exists among the laboratories that conduct this test. The BLPT does not at this time meet the criteria for a screening test. Despite its limitations however, the BLPT remains a useful disease surveillance tool.

8.13 RISK FACTORS

Specific genetic factors have been identified and have been shown to increase an individual's susceptibility to CBD. Medical testing is available to detect genetic factors in individuals.

8.14 OCCUPATIONAL EXPOSURE LIMITS

Brush Wellman recommends following good industrial hygiene practice which includes reducing airborne exposures to the lowest feasible level for all constituents in this product. Brush Wellman recommends that users of beryllium-containing materials maintain worker exposures to airborne beryllium to levels reliably below its recommended exposure guideline (REG) of 0.0002 milligrams beryllium per cubic meter of air.

CONSTITUENTS	OSHA*			ACGIH*		NIOSH RTECS NUMBER
	PEL	CEILING	PEAK	TLV	TLV-STEL	
Beryllium	0.002	0.005	0.025	0.002	0.01	DS1750000
Cobalt	0.1	N/A	N/A	0.02	N/A	GF8750000
Copper Dust & Mist	1	N/A	N/A	1	N/A	GL5325000
Copper Fume	0.1	N/A	N/A	0.2	N/A	GL5325000
Nickel	1	N/A	N/A	1.5	N/A	QR5950000
Zirconium	5	N/A	N/A	5	10	ZH7070000

*ALL CONCENTRATIONS ARE IN MILLIGRAMS PER CUBIC METER OF AIR
(at the concentrations noted above, these constituents may not be visible to the human eye)

A leading scientific body recommending occupational standards is the American Conference of Governmental Industrial Hygienists (ACGIH). The ACGIH recommends standards for all listed substances. The ACGIH defines a threshold limit value (standard) as follows: "Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Because of wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the threshold limit; a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness." "Individuals may also be hypersusceptible or otherwise unusually responsive to some industrial chemicals because of genetic factors, age, personal habits

(smoking, alcohol, or other drugs), medication, or previous exposures. Such workers may not be adequately protected from adverse health effects from certain chemicals at concentrations at or below the threshold limits.”

ACGIH	=	American Conference of Governmental Industrial Hygienists
OSHA	=	Occupational Safety and Health Administration
PEL	=	Eight-Hour Average Permissible Exposure Limit (OSHA)
CEILING	=	Not To Be Exceeded Except For Peak Limit (OSHA)
PEAK	=	30-Minute Maximum Duration Concentration Above Ceiling Limit (OSHA)
TLV	=	Eight-Hour Average Threshold Limit Value (ACGIH)
TLV-STEL	=	15-Minute Short Term Exposure Limit (ACGIH)
CAS	=	Chemical Abstract Service
NIOSH	=	National Institute For Occupational Safety and Health
RTECS	=	Registry of Toxic Effects of Chemical Substances
NA	=	Not Applicable

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Boiling Point (°F):	Not Applicable	Radioactivity:	Not Applicable
Evaporation Rate:	Not Applicable	Solubility:	None
Freezing Point (°F):	Not Applicable	Sublimes At (°F):	Not Applicable
Odor:	None	Vapor Density (Air = 1):	Not Applicable
pH:	Not Applicable	Vapor Pressure (mmHg):	Not Applicable
Physical State:	Solid	% Volatiles By Volume:	None

PHYSICAL PROPERTIES			
Alloy Number/Product Name	Color	Melting Point (°F)	Density (lb/in3)
10 (C17500)	Copper	1850	0.319
10X, Q-Max® (C17500)	Copper	1830	0.311
165 (C17000)	Brass	1600	0.304
170	Gold	1600	0.302
171 (C17450) Brush 60®, BrushForm® 47, BrushForm® 65, (C17460)	Copper	1885-1960	0.323
174 (C17400) (C17410) (C17420)	Copper	1875	0.318
25, 190, BrushForm® 290 (C17200)	Brass	1600	0.302
3 (C17510)	Copper	1900	0.319
310	Copper	1875	0.319

10. STABILITY AND REACTIVITY

General Reactivity	The material is stable
Incompatibility (materials to avoid)	Reacts with some acids and caustic solutions to produce hydrogen gas. Hydrogen gas can be an explosion hazard. Powdered aluminum and chlorinated hydrocarbons may react with explosive violence.
Hazardous Decomposition Products	None under normal conditions of use.
Hazardous Polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION

For questions concerning toxicological information, write to: Medical Director, Brush Wellman Inc., 14710 West Portage River South Road, Elmore, Ohio 43416-9502.

12. ECOLOGICAL INFORMATION

This material can be recycled; contact your Sales Representative.

13. DISPOSAL CONSIDERATIONS**13.1 BYPRODUCT RECYCLING**

When recycled (used in a process to recover metals), this material is not classified as hazardous waste under federal law. Seal particulate or particulate containing materials inside two plastic bags, place in a DOT approved container, and label appropriately.

13.2 SOLID WASTE MANAGEMENT

When spent products are declared solid wastes (no longer recyclable), they must be labeled, managed and disposed of, in accordance with federal, state and local requirements. This material may contain one of the following metals regulated under RCRA; chromium, or lead. See Section 2 for chemical composition.

14. TRANSPORT INFORMATION

There are no U.S. Department of Transportation hazardous material regulations which apply to the packaging and labeling of this product as shipped by Brush Wellman.

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration require this product be labeled.

15. REGULATORY INFORMATION**15.1 UNITED STATES FEDERAL REGULATIONS****15.1.1. Occupational Safety and Health Administration (OSHA)**

Air contaminants, 29 CFR 1910.1000
Hazard Communication Standard, 29 CFR 1910.1200

15.1.2. Environmental Protection Agency (EPA)

AMBIENT AIR EMISSIONS: Foundries melting alloys containing beryllium are subject to the National Emission Standard for Beryllium as promulgated by EPA (40 CFR 61, Subpart C). Facilities machining alloys containing greater than 5% beryllium also are subject to the National Emission Standard for beryllium. The National Emission Standard for beryllium is 0.01 micrograms per cubic meter (30 day average) in ambient air

for those production facilities which have been qualified to be regulated through ambient air monitoring. Other facilities must meet a 10 gram per 24-hour total site emission limit. Most process air emission sources will require an air permit from a local and/or state air pollution control agency. The use of air cleaning equipment is recommended to achieve the permissible emission. Provide tempered makeup air to prevent excessive negative pressure in a building. Direct recycling of filtered process exhaust air is not recommended. Locate plant exhausts so as not to re-enter the plant through makeup air or other inlets. Regular maintenance and inspection of air cleaning equipment and monitoring of operating parameters is recommended to ensure system efficiency is maintained.

WASTEWATER: Wastewater regulations can vary considerably. Contact your local and state governments to determine their requirements.

TOXIC SUBSTANCES CONTROL ACT: This material is a mixture. Component(s) of this material is/are listed on the TSCA Chemical Substance Inventory of Existing Chemical Substances

SARA TITLE III REPORTING REQUIREMENTS: On February 16, 1988 the U.S. Environmental Protection Agency (EPA) issued a final rule that implements the requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III, Section 313 (53) Federal Register 4525. Title III is the portion of SARA concerning emergency planning and community right-to-know issues. Section 313 covers annual emission reporting on specific chemicals which are manufactured, processed or used at certain U.S. Industrial facilities.

Brush Wellman products are reportable under the Section 313 category of Compounds and/or Mixtures. These mixtures contain one or more of the following reportable constituents: Beryllium, Cobalt, Copper, and Nickel. The specific chemical makeup, concentration by weight and the Chemical Abstracts Services number for each of our products is provided in Section 2.

You may obtain additional information by calling the EPA SARA Title III Hotline at 1-800-535-0202 (or 703 412 9810).

15.2 STATE REGULATIONS

Beryllium

- Is listed on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota and Massachusetts.
- The following statements are made in order to comply with the California State Drinking Water Act - Warning: This product contains BERYLLIUM, a chemical known to the state of California to cause cancer.
- California No Significant Risk Level: CAS# 7440-41-7: No significant risk level = 0.1 ug/day

Cobalt

- Is listed on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
- The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act WARNING: This product contains COBALT, a chemical known to the state of California to cause cancer.
- California No Significant Risk Level: Not listed.

Copper

- Is listed on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts. California No Significant Risk Level: Not listed.

Nickel

- Is listed on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
- The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act - WARNING: This product contains NICKEL, a chemical known to the state of California to cause cancer.
- California No Significant Risk Level: Not listed.

Zirconium



- Is listed on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
- California No Significant Risk Level: Not listed.

15.3 CANADA

Constituent	DSL/NDSL	WHMIS Classification	Ingredient Disclosure List
Beryllium	Yes/No	D2A,D2B	Yes
Cobalt	Yes/No	D2A,D2B	Yes
Copper	Yes/No	D2B	Yes
Nickel	Yes/No	D2A	Yes
Zirconium	Yes/No	D2B	Yes

16. OTHER INFORMATION

Following is the label which accompanies this product during shipment.

<p>A10</p> <p style="text-align: center;">Copper Beryllium Wrought Alloy</p> <p style="text-align: center;">  WARNING  </p> <p>INHALING DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE, A SERIOUS CHRONIC LUNG DISEASE, IN SOME INDIVIDUALS. CANCER HAZARD. OVER TIME, LUNG DISEASE AND CANCER CAN BE FATAL. TARGET ORGAN IS PRIMARILY THE LUNG.</p> <p>READ THE MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL.</p> <p>This product contains beryllium and may contain nickel. Overexposure to beryllium by inhalation may cause chronic beryllium disease, a serious chronic lung disease.</p> <ul style="list-style-type: none"> If processing or recycling produces particulate, use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding, grinding, abrasive sawing, sanding and polishing. Any activity which abrades the surface of this material can generate airborne particulate. The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational exposures. Copper beryllium, in solid form and as contained in finished products presents no special health risks. Sold for manufacturing purposes only. This product can be recycled; contact your sales representative. <p>The Occupational Safety and Health Administration requires employers to provide training in the proper use of this product.</p> <p>For further information, please telephone or write to: Product Stewardship Department, Brush Wellman Inc., 17876 St. Clair Avenue, Cleveland, Ohio 44110, telephone: (800) 862-4118, www.brushwellman.com. For transportation emergency call Chemtrec at (800) 424-9300.</p> <p style="text-align: right;">A10</p>

*Label may vary in size

*Label color (light blue edge with black lettering)

This MSDS has been revised following the guidelines outlined in the American National Standard for Hazardous Industrial Chemicals - "Material Safety Data Sheets - Preparation." Z400.1-1998

MSDS Status: Added recommended exposure guideline to Section 8.14

IMPORTANT: If you have any questions or require additional information regarding the materials described in this Material Safety Data Sheet, please telephone or write to the Product Stewardship Department at the location given on page 1. Additional product safety information, such as Safety Facts, is available from your sales representative or at www.brushwellman.com or www.befacts.com.