

MATERIAL SAFETY DATA SHEET

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Tuffaloy Materials (55,44)

I. GENERAL

A. Trade Names:

1. Tuffaloy - 55 Alloy (RWMA Class 3)
Beryllium Copper
2. Tuffaloy - 44 Alloy (RWMA Class 4)
Beryllium Copper

II. SUMMARY OF HAZARDS

Metal machining or grinding operations may produce fine particulate or dust; heating, melting, welding, or brazing may produce metal fumes and particulates. Inhalation of excessive fume or dust concentrations may result in respiratory tract irritation, eye irritation, and/or metal fume fever, and/or A-1 zirconium poisoning; A-2 chromium poisoning; A-3 chromium zirconium poisoning.

III. FIRE AND EXPLOSION

A. Flash Point (method) – N/A

B. Autoignition Temperature – N/A

C. Flammable Limits- Lower, N/A Upper, N/A

D. Fire and Explosion Hazards

Dust hazard exists under favoring conditions of small particle size. Dispersion in air and strong ignition source may result in an explosion.

E. Extinguishing Media

Use dry powder for metal fires. Gently spoon media onto fire. Do not disturb particles.

F. Special Firefighting Procedures

Do not enter fire area without proper protection including pressure-demand, self-contained breathing apparatus.

IV. HEALTH HAZARDS

A. Summary of Acute Hazards:

Respiratory tract, irritation, metal fume fever, eye irritation.

B. Summary of Chronic Hazards:

Chronic Inhalation may cause berylliosis, a serious chronic lung disease, with cough, chest pain, shortness of breath, weight loss, weakness, and fatigue.

C. Route of Exposure

1. Inhalation

Inhalation of excessive fume or dust concentrations may result in respiratory tract irritation and metal fume fever.

2. Eye Contact

Mechanical irritation may result from an accumulation of dust particles in the eye.

3. Skin Absorption

No significant signs or symptoms indicative of any adverse health hazard are expected to occur.

4. Skin Irritation

No significant signs or symptoms indicative of any adverse health hazard are expected to occur.

5. Ingestion

This material may be toxic if swallowed in large quantities.

D. Summary of Chronic Hazards and Special Health Effects

Chronic inhalation may cause berylliosis, a serious chronic lung disease, with cough, chest pain, shortness of breath, weight loss, weakness, fatigue, birth defects and lung cancer First aid: Remove from exposure and consult a physician. Handling of solid shape presents no dermatitis or skin absorption problem.

Hazard communication regulations of the Occupational Safety & Health Administration require that caution labels for materials listed as potential carcinogens in either the International Agency for Cancer Research monograph series or the National Toxicology Program annual report on carcinogens must contain a cancer warning. Beryllium has been so listed based principally on animal tests and therefore, as shipped by Tuffaloy, this data sheet identifies it as a potential cancer hazard.

V. PROTECTIVE EQUIPMENT AND OTHER CONTROL MEASURES

A. Respiratory

If exposure exceeds the PEL/TVL, use NIOSH/MSHA approved respiratory protection equipment as specified in the NIOSH/OSHA Occupational Health Guidelines for chemical hazards.

B. Eye

Use safety glasses with side shields or goggles to prevent injury from flying particles or high dust concentrations. Use goggles or shield with appropriate light-filtration during welding or cutting operations.

C. Skin

Where use can result in skin contact with particulate, practice good hygiene. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking.

D. Engineering Controls

Use adequate ventilation to keep fume or dust concentration below the occupational exposure limits shown in Section Vi. (Refer to ANSI Z49.1, "Safety in Welding and Cutting" and "OSHA Regulation" CFR 1910.252.)

E. Other Hygienic and Work Practices

Where applicable, use protective gloves to protect against heat or sharp metal edges.

VI. OCCUPATIONAL EXPOSURE LIMITS

1. Tuffaloy - 55 Alloy Beryllium Copper

2. Tuffaloy - 44 Alloy Beryllium Copper

SUBSTANCE	ACGIH TLV's (2004)		OSHA PEL's (2000)		NIOSH REL's (2003)	
	TWA	STEL/CEIL	TWA	STEL/CEIL	TWA	STEL/CEIL
Copper Fume	0.2	0.1	0.1	N/A	0.1R	II (2)
Copper Dust and Mist, as Cu	1	N/A	1	N/A	1	N/A
Beryllium	0.002	0.01	0.002	C 0.005; 0.025* *30 min peak per 8-hr shift	N/A	C 0.0005
Cobalt	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	N/A	N/A	N/A	N/A	N/A	N/A
Silicon	10	N/A	15*,5** *Total Dust ** Respirable Fraction	N/A	10*,5** *Total Dust ** Respirable Fraction	N/A

VII. EMERGENCY AND FIRST AID

- A. Inhalation
Immediately remove from contaminated area to fresh air. If irritation persists, or if other signs or symptoms develop, seek medical attention.
- B. Eye Contact
Mechanical injury only. Treat as mechanical injury only. Treat as inert foreign body.
- C. Skin Contact
Not expected to present a significant skin contact hazard under anticipated conditions of normal use.
- D. Ingestion
Not expected to present a significant ingestion hazard under anticipated conditions of normal use.
- E. Emergency Medical Treatment Procedures
Metal fume fever may be treated symptomatically.

VIII. SPILL AND DISPOSAL

- A. Precautions if Material is Spilled or Released
No notable environmental hazard is anticipated to be associated with the accidental "release" of this material on land. This material should be recovered from aquatic environments. Because of the potential inhalation hazard inherent in the handling of fine, dust-like material (such as baghouse fines) we recommend it be:
 - 1) Sealed in two plastic bags,
 - 2) Placed in a sound container,
 - 3) Labeled as a "Beryllium Containing Material", and
 - 4) Shipped to either a recycling facility or an approved hazardous waste disposal site. If greater than one pound of such metal dust or powder is released into the environment, report the spill immediately to the National Response Center (800) 424-8802.
- B. Waste Disposal Methods
Maximize product recovery for reuse or recycling. Conditions of use may cause this material to become a solid "hazardous waste" as defined by state or federal laws. Solid waste "leachate" testing may indicate the need for properly permitted disposal of such wastes in compliance with all applicable laws. Conditions of use may also generate liquid wastes with metal concentrations in excess of those permitted through pretreatment or direct discharge requirements. Appropriate analyses should be conducted to ensure compliance with existing wastewater permits.

IX. COMPONENTS

- B. Tuffaloy - 55 Beryllium Copper
- C. Tuffaloy - 44 Beryllium Copper

<u>Component Name</u>	<u>CAS No.</u>	<u>Carcinogen ##</u>	<u>Composition amount (vol.)</u>
Beryllium	7440-41-7	1,2,4	0.20 to 2.00%
Cobalt	7440-48-4	2	0.20 to 0.35%
Copper	7440-50-8	N/A	REMAINDER
Nickel	7440-02-0	1,2,4	0.20 to 2.20%
Silicon	7440-21-2	N/A	0.20%

Listed by: 1 = NTP, 2 = IARC, 3 = OSHA, 4 = Other

X. PHYSICAL AND CHEMICAL DATA

Boiling Point – N/A

Viscosity Units, Temp. (method) – N/A

Dry Point – N/A

Freezing Point – N/A

Vapor Pressure – N/A

Volatile Characteristics – N/A

Specific Gravity (H₂O = 1 at 39.2°) - 8.89 Vapor

Sp. Gr. (Air = 1.0 at 60° - 90° F) – N/A

Solubility in Water – N/A

pH – N/A

Hazardous Polymerization – N/A

Other Chemical Reactivity – N/A

Stability - Stable

Other Physical and Chemical Properties:

 Melting Point: 1600 F degrees min.

Appearance and Odor

 Color - Copper Metallic. Odorless.

Conditions to Avoid

 Exposure during storage to strong acids, or oxidizing agents.

Materials to Avoid

 Mercury, ammonia and acetylene.

Hazardous Decomposition Products

 Toxic gases, aerosols and vapors may be released in a fire involving copper alloys if fumes of other compounds or other contacting materials are involved.

XI. ADDITIONAL PRECAUTIONS

A. Handling, Storage and Decontamination Procedures

 Good housekeeping must be practiced during storage, transfer, handling and use to avoid excessive dust accumulation. Apply recommendations of NFPA 491 M for copper alloys.

B. General Comments

 Symptoms of metal fume fever may last 24 to 48 hours and may include a sweet or metallic taste in the mouth, dryness and irritation of the throat, cough, shortness of breath, chest pain, nausea, vomiting, weakness, fatigue, muscle and joint pain, chills, sweating and fever.

 Salts of metal components have demonstrated mutagenic potential in several bioassays but the health significance of the results is not known. Use good personal hygiene. Wash hands with mild soap and water before eating, drinking, smoking, or before leaving work after contact with metal dust or fume.

C. When welding, melting and casting, dry grinding, dry sanding, polishing, or otherwise abrading the surface of beryllium alloys in a manner which generates finely divided particles, an exposure to airborne beryllium in excess of the occupational standard can occur. Under these conditions, local exhaust ventilation at the point of generation is the preferred method of control. The normal machining of beryllium alloys does not pose a problem of exposure to airborne beryllium; however, cast beryllium alloys must have the scale, containing beryllium oxide, cleaned from the surface before machining to prevent potential exposure. Grinding or sanding operations under a liquid coolant do not pose an exposure potential; unless by recycling the liquid coolants, the concentration of finely divided beryllium alloy reaches a point where particulate becomes airborne during its use. This source can be controlled by an in-line coolant centrifuge. Operations generating airborne beryllium must be air sampled to determine exposure levels. Where exposure data indicates, medical surveillance should be conducted

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