COPPER BERYLLIUM

HEALTH & SAFETY NOTES

Copper Development Association
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Components made from copper-beryllium alloys can normally be fabricated and used with complete safety. However, if fumes or dust is likely to be created by any process such as those described below, there may be a health risk.

Introduction

Section 6 of the Health and Safety at Work Act 1974 (as amended by Schedule 3 of the Consumer Protection Act 1987) required the supplier of copper-beryllium (sometimes known as beryllium-copper) products to advise customers by means of a Health and Safety Data Sheet of the safety precautions to be taken with these products. The following general guidance notes have been produced on behalf of the manufacturers of copper-beryllium products. The individual supplier should be approached for detailed advice regarding specific handling, processing, manufacturing and disposal procedures. If in doubt regarding the adequacy of any of these procedures the Company Safety Officer should consult the appropriate Safety Council.

Handling

There are no special toxic hazards associated with the handling of copper beryllium alloys or with material taken orally. However cuts and abrasions should be treated by normal first aid methods and it is advised that after contact with copper-beryllium alloys the hands should be washed before food is eaten. Care should also be taken, as with other metal alloys, to remove all metal particles from the wound whilst normal hygiene standards should be observed.

Non-hazardous operations

General handling, stamping and forming, many machining operations, medium temperature hardening heat treatments, cleaning, plating, soldering and general assembly and disassembly operations are considered safe and do not require specific controls other than general levels of ventilation.

Health hazards

The only circumstances under which a health risk can exist relate to processes involving the emission of dust or fumes from copper-beryllium alloys, this by producing respirable particles, especially in the size range 0.5 - 0.7 microns. Inhalation of such dust or fumes can cause serious pulmonary illness in a small percentage of people (around 4%). Since individuals at risk cannot be previously identified it is necessary to protect all potentially exposed persons. Reference should be made to Health and Safety Executive (UK) Guidance Note EH44 - `Dust in the workplace: general principles of protection'.

Permissible levels

The Health and Safety Executive (UK) - Guidance Note EH13 `Beryllium - health and safety precautions' has established a Maximum Exposure Limit of 2 microgrammes per cubic metre of air (8 hour Time Weighted Average). Hence operations generating dust or fume from the alloys must be controlled to meet this limit and to reach the lowest practicable levels below the limit.

Hazardous operations
Operations which could potentially lead to airborne contamination above the permissible levels include grinding, abrasive cutting, abrading, polishing, spark erosion and electro-chemical machining, high temperature heat treatments, welding, melting and casting. These operations require controls and air monitoring to ensure their safety. The controls depend upon individual circumstances, ranging from the simple use of coolants and lubricants to entrap dusts, to local or general air extraction and filtration systems to draw air across the work and away from the worker.

Specifically heat treatments, such as ageing, solution annealing or re-heating for forging should be carried out in closed furnaces. In addition furnace maintenance workers should wear air-supplied breathing masks.

Oxide films formed during heat treatment may become airborne during vigorous operations, such as tumbling. Hence it is recommended that oxides should be removed by pickling and spent pickling fluids should be disposed of by standard methods without evaporation. Similarly in the case of spark erosion and chemical machining the working fluids should be diluted and disposed of as liquids.

Labelling
Solid wrought or cast forms of copper-beryllium alloys (e.g. strip, rod, wire etc) do not require any form of hazard labelling. However they should be labelled for identification purposes and it is necessary for the supplier to provide a Material Safety Data certificate with the first supply.

Spillage and Disposal
All waste material should be carefully collected, placed in a labelled container and disposed of in accordance with local and national regulations. Scrap copper-beryllium is not subject to any special restrictions for transportation.

1. The potential risks if copper-beryllium alloy scrap is recycled by re-melting in conventional melting equipment require any clean scrap arising to be segregated from other alloys and advised to the potential purchaser.

2. If recycling is not practicable, solid copper beryllium or components containing copper-beryllium can be landfilled, shredded or incinerated without causing any damage to the environment, subject to normal waste disposal regulations.

3. Other solid waste from copper beryllium processes should be placed in impervious containers and disposed of through waste disposal contractors, who must be notified of the contents. Operators loading containers should wear air-supplied breathing masks.

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