



March 28, 2008

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RE: Study on Hazardous Substances in Electrical and Electronic Equipment (EEE), not Regulated by the RoHS Directive

NGK Insulators, LTD. (NGK) supports the objectives of the European Commission in identifying hazardous substances that have major impacts on and risks for the environment and human health, and that may constitute significant health and environmental risks. In response to the consultation in above mentioned study, NGK submits the following comments with respect to Beryllium metal, specifically copper-beryllium (CuBe) alloys as listed in ID 4 of Table I: Hazardous substances in EEE – high priority of documents associated with this study, and its applications in the electronics sector.

NGK's experience is that CuBe alloys are used in a wide range of demanding applications including electronic connectors, IC sockets and switches, across a range of industry sectors such as automotive, electronics and industrial processes. The reason for the widespread use of CuBe alloys is the result of key mechanical and physical properties of the alloy which include high strength, conductivity and formability. Additionally, the use of CuBe alloys has contributed the advancement of electronic equipments by supporting miniaturization of components and extending their working life, and has resulted in mitigating the environmental load.

As examples, CuBe alloy used in mobile phones and PCs is enumerated as follows.

- Mobile Phone (Refer to Fig. 1)

- Battery Contact, Speaker Contact, EMI Shield Contact, BtoB Connector, FPC Connector
Antenna Contact, SIM Card Connector, Motor Contact, DC Jack Contact,
Microphone Contact

- PC

- I/O connector, BtoB connector, battery contact, burn-in testing socket, mount socket,
PCMCIA connector, optical pickup suspension (CD, MD, DVD)

NGK is aware of health concerns that have been raised in recent years regarding the use of Beryllium. Scientific evidence indicates that the main exposure risks associated with Beryllium result from activities involving grinding or smelting operations in which people may be exposed

to fine particles of beryllium or fume. During normal operation and use of products containing CuBe alloys, such as mobile phones, the millions of people who benefit from these equipments are not placed at risk from the use of CuBe alloys. Rather, potential exposure lies with the smaller number of people involved in end of life product dismantling activities. The risks in these activities can be mitigated by raising awareness amongst people involved in these activities to implement basic pollution control and prevention practices, which has the additional benefit of reducing non-CuBe alloy related potential health and environmental risks.

Guidelines developed by the United Nations Environment Program (UNEP) on Material Recovery and Recycling of End-of-Life Mobile phones reports that a modern mobile phone contains approximately 40ppm of beryllium per handset. The guideline goes on to conclude that beryllium is not an absolute barrier to environmentally sound material recovery and recycling but is a consideration in selection of appropriate recovery processes and facilities.

NGK performed a review of current regulatory controls and industry standards regarding the use of CuBe alloys as part of an internal process of assessing product related chemical risks. This review indicated the following:

- No regulatory controls were identified which ban or restrict the use of CuBe alloys
- The German Association of the Automotive Industry (VDA) defines beryllium as a declarable substance (VDA list DA 232-101) but places no restrictions on beryllium compounds (including CuBe alloys)
- C4CE (CEFIC-EECA-EICTA-EUROMETAUX) describes in a guidance document that CuBe alloys are classified as non-toxic substances that can be safely handled
- Joint Industry Guide (JIG) published by the U.S.- Japanese electronic equipment industries and the International Material Data System (IMDS) identify beryllium as a declarable substance but its use is not banned or restricted

In conclusion, NGK considers that exposure related risks in CuBe alloy production and end of life product dismantling can be mitigated through implementation of basic risk mitigation measures without disadvantaging the large number of users who benefit from the use of products containing CuBe alloys. CuBe alloy is recyclable material. Life cycle environmental risks of CuBe alloy are so small that they are permissible (Refer to Fig. 2). We can safely use CuBe alloy with few risks.

Because of the CuBe's properties, it is an important alloy in the continued advancement of electronics equipment. CuBe alloys used in electronic equipments and automobiles perform their part most effectively. The miniaturization and extending working life of components by using CuBe alloy lead to energy and resource saving, and mitigate the environmental load.

Moreover, it is well known that the substitution of CuBe alloy is difficult. If using CuBe alloy is restricted, we may be unable to have the benefit of energy and resource saving by the miniaturization and extending working life of many electronic components. In future, CuBe

alloy is the material needed more and more for the advancement of electronic equipments.

Sincerely yours,

N. Sakamoto

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Manager

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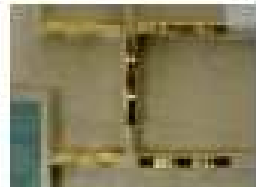
Major Application of CuBe

Fig. 1

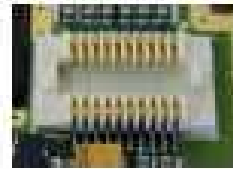
--- Mobile Phone ---



Battery Contact



EMI Shield Contact



BtoB Connector



FPC Connector



Antenna Contact



Battery Contact



SIM card Connector



Motor Contact



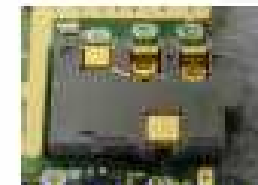
Speaker Contact



Microphone Contact



DC Jack Contact



Jack Contact

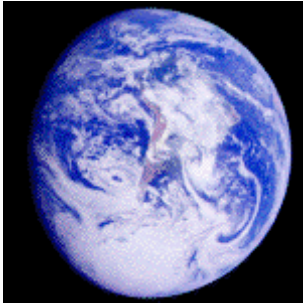


Environmental risks on CuBe alloy

Fig. 2

(1) Be in general environment

- Regulation : none
- Background
 - Air : 0.042 ng / m³
(0.0018 – 1.0 ng / m³)
 - Soil : 6 ppm



(3) Parts maker

- Stamping, forming of CuBe alloy
- No Be inhalation : No Risk

(4)

Cellular phone manufacturer / Cellular phone user

- Stability during the lifetime
- No Be inhalation : No Risk



(2) CuBe alloy manufacturer

- Compliance with in-plant regulation
- In-plant regulation : 2 micro g / m³
- No generation of beryllium disease



(5) Processing contractor

- Environment risks are so small that they can be disregarded.
- << Copper refinement >>
(An example of assessment)
- Ambience : 0.008 ng / m³
 - Workplace : < 0.18 micro g / m³

