

Consultation Questionnaire Exemption No. 6c (renewal request)

Exemption for „Copper alloy containing up to 4 % lead by weight“

Abbreviations and Definitions

EEE Electrical and Electronic Equipment

Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract¹ for the evaluation of applications for the renewal of exemptions currently listed in Annexes III of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.¹

Contribution

The contribution to the RoHS stakeholder consultation (Pack 9) regarding exemption 6c is submitted on behalf of the participating industry associations and companies listed below (Applicant 3 in the 2015 consultation of RoHS exemption 6c):

Association of Equipment Manufacturers (AEM)



IPC-Association Connecting Electronics Industries



Communications and Information network Association of Japan (CIAJ)

マークカラー-英文100%



Japan Business Council in Europe (JBCE)
ID: 68368571120-55



European Committee of Domestic Equipment Manufacturers (CECED)
ID: 04201463642-88



Japan Business Machine and Information System Industries Association (JBMIA)
ID: 246330915180-10



European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR)
ID: 05366537746-69



Japan Electrical Manufacturers' Association (JEMA)



DIGITALEUROPE
ID: 64270747023-20



Japan Electronics and Information Technology Industries Association (JEITA)
ID: 519590015267-92



¹ Contract is implemented through Framework Contract No. ENV.C.2/FRA/2011/0020 led by Eunomia

European Copper Institute (ECI)
ID: 04134171823-87



Knowles



European Garden Machinery industry Federation (EGMF)
ID: 82669082072-33



LIGHTINGEUROPE
ID: 29789243712-03



European Partnership for Energy and the Environment (EPEE)
ID: 22276738915-67



Littelfuse



European Passive Components Industry Association (EPCIA)
ID: 22092908193-23



Orgalime, the European Engineering Industries Association
ID: 20210641335-88



European Power Tool Association (EPTA)
ID: 85810161889-67



Wirtschaftsvereinigung Metalle (WVM)
ID: 9002547940-17



European Semiconductor Industry Association (ESIA)
ID: 22092908193-23



ZVEI - German Electrical and Electronic Manufacturers' Association
ID: 94770746469-09



Information Technology Industry Council (ITI)
ID: 061601915428-87



Questions

1. Some applicants have requested the renewal of Ex. 6c of Annex III, with the same wording formulation. The applicant Dunkermotoren have requested the renewal of Ex. 6c, however indicate that a lower threshold for the lead content of <1% by weight would also be feasible.

- a. Please specify with which of the proposed formulations you agree.
- b. Please suggest an alternative wording and explain your proposal, if you do not agree with one of the proposed exemption wording.
- c. Please explain why you support or object the various proposals. To support your views, please provide detailed technical argumentation / evidence in line with the criteria in Art. 5(1)(a).

1.a-c. Dunkermotoren and Framo Morat gave an interesting example for a lead containing copper alloy used for gears and parts of gears. Both use the alloy CuZn37Mn3Al2PbSi. This alloy contains lead in a concentration of 0.2 to 0.8%.²

Both applicants stated the alloy is used due to its mechanical behavior when produced and during the use.

The electrical resistivity of CuZn37Mn3Al2PbSi is given as 0.125 (Ωmm^2)/m at 20°C². The resistivity of the alloy CuZn39Pb3 that is widely used for conductive applications is only 0.066 (Ωmm^2)/m at 20°C and thus only the half of that of CuZn37Mn3Al2PbSi.³ In consequence the alloy used by Dunkermotoren and Framo Morat cannot be considered as a substitute for conductive applications.

Framo Morat stated that the alloy CuZn37Mn3Al2PbSi is used since very long time.⁴ Thus Dunkermotoren and Framo Morat do not report about a case where the lead content could be reduced to 1% but it gives an example for an alloy with more than 0.1% lead that was used with ca. 1% of lead since ever.

It is interesting that Framo Morat states that the so called ECO BRASS[®], that is sometimes offered as lead-free substitute for purely mechanical applications, did not satisfy their needs.⁵

Dunkermotoren did not report about possible alternative alloys but it only stated that research on them will be performed.⁶ The statement (so far only in German language available) “Klärung Alternativmaterialien mit gleichwertigen Eigenschaften.“ cannot be taken in a way that Dunkermotoren already found an alternative. It rather has to be understood that this is the first step and only if an alternative was found the process of approval by the customers and requalification that is estimated to require two to five years could be started.

Summarising Dunkermotoren and Framo Morat gave in a comprehensive way a renewal request for one example of one specific lead containing copper alloy that is used for a specific type of applications. Both applicants showed that it is not possible to substitute the now used alloy CuZn37Mn3Al2PbSi in their applications. Furthermore they did not give any information about other alloys and applications in the electrical and electronic industry. Thus in no way the renewal requests of Dunkermotoren and Framo Morat may be seen as indication that a reduction of the maximum lead content under exemption 6c could be possible.

The current wording of exemption 6c: “Copper alloy containing up to 4 % lead by weight” has to be kept.

² See:
https://www.kupferinstitut.de/fileadmin/user_upload/kupferinstitut.de/de/Documents/Shop/Verlag/Downloads/Werkstoffe/Datenblaetter/Messing/CuZn37Mn3Al2PbSi.pdf

³ See:
https://www.kupferinstitut.de/fileadmin/user_upload/kupferinstitut.de/de/Documents/Shop/Verlag/Downloads/Werkstoffe/Datenblaetter/Messing/CuZn39Pb3.pdf

⁴ See renewal request of Framo Morat, page 1: “Therefore the used properties base on decades of internal testing and recording.”

⁵ See renewal request of Framo Morat, page 1: „First tests with possible substitutes, for example ECOBRASS or other lead free (<0.1%) materials, were not satisfying. The substitutes did not reach the mechanical properties of the used one.”

⁶ See renewal request Dunkermotoren, page 2: “Klärung Alternativmaterialien mit gleichwertigen Eigenschaften [...]“

7. It can be understood that the following properties are of importance in applications for which leaded-copper alloys are used at present, or for the manufacture of such applications:

- In manufacture of applications where machinability is of importance:
 - ductility properties;
 - lubrication properties;
 - chipping properties;
- In the use of applications:
 - Ductility properties;
 - Corrosion resistance properties;
 - Lubrication properties;

a. Please confirm that this list is exhaustive, or alternatively clarify what additional properties are of relevance for applications of leaded copper alloys;

b. For each property please specify what performance is required so that it is clear how to compare between possible substitutes and leaded copper alloys – i.e. for each property please indicate a performance indicator as well as the acceptable level of performance that needs to be exhibited by substitutes;

c. Please indicate if there exist interrelations between certain properties and if these would impact the range of acceptable performance;

d. Please if the exemption formulation could be adapted to reflect the need for these properties in relevant applications and propose a formulation respectively;

a-d. Oeko Institut already identified from the renewal requests some properties that are of importance. But the list is unfortunately not yet exhaustive. Among others at least the following are missing: electrical conductivity, thermal conductivity, cold deforming behavior, resistance welding, galvanizing ability, soldering at higher temperatures than 450 °C, relaxation behavior, crimp ability, spring behavior, high-speed stamping, physical properties (melting point, coefficient of thermal expansion, etc.), fabrication process properties (hot forming, brazing, etc), etc.

Regarding the performance indicators and interrelations please see the renewal request and the answers to the clarifying questions already given.

We can confirm that a property as well as interrelations cannot be seen as independent from the application. Thus millions of data sets would be required to show the required performance of each property linked to the application. This is unfortunately not possible during this approach.

In consequence there is no way to adapt the exemption formulation.