Response on Behalf of Eurofer in Support of Retention of Existing Exemption 6 from the Annex to Directive 2002/95/EC

Öko-Institut e.V. Adaptation to Scientific and Technical Progress under Directive 2002/95/EC - Stakeholder Consultation - General Questionnaire

2. To support an existing exemption or taken as a basis for requesting an amendment or the discontinuation of an existing exemption.

- For which substance(s) or compound(s) should the requested exemption be valid?

  The request is for a continuation of the existing exemption 6: "Lead as an alloying element in steel containing up to 0.35% lead by weight, aluminium containing up to 0.4% lead by weight and as a copper alloy containing up to 4% lead by weight"

- What is the application in which the substance/compound is used for and what is its specific technical function?

  The specific application in which the lead is used is for 'machining steel'. Machining steel is used where individual components require machining as part of their production route.

  The specific function of the addition of lead to steels requiring good machinability can be described in a number of ways. Fundamentally, lead is added to enable improved machinability. Machinability can be considered as meaning any of the following; a reduced cutting force when machining steel, appropriate chip formation (length and form), facilitation of a smooth surface finish, facilitation of good dimensional achievement under commercial production conditions or reduced 'tool wear' during the machining operation.

  Machining encompasses a number of production operations, including; turning, grinding, rough forming, fine forming, drilling and parting.

- What is the specific (technical) function of the substance/compound in this application?

  The specific function of lead in steel is to provide a lubrication effect from the material itself when that material is being machined into a component. Through this lubrication effect, the steel becomes more machinable.

- Please justify why this application falls under the scope of the RoHS Directive (e.g. is it a finished product? is it a fixed installation? What category of the WEEE Directive does it belong to?).

Machining steels are used in a diverse range of final applications within electrical and electronic equipment, including finished products, fixed installations etc.

- What is the amount (in absolute number and in percentage by weight) of the substance/compound in: i) the homogeneous material1, ii) the application and iii) total EU annually for RoHS relevant applications?

  Machining steels currently produced in Europe comply with existing legislation for automotive and electrical applications (ELV Directive and WEEE Directive), in that there is no more than 0.35 %, by weight, lead contained in these steels. The lead is distributed throughout the supplied steel so that this percentage does not vary through the production route or finished component. It is important to note that lead is stable within the material, such that there is no loss during production processes, other than in discarded metal.

- Please check and justify why the application you request an exemption for does not overlap with already existing exemptions respectively does not overlap with exemption requests covered by previous consultations.

  Not relevant as this submission relates to an existing exemption.

- Please provide an unambiguous wording for the (requested) exemption.

  The current wording is satisfactory, although this submission only relates to the first part of the exemption, that is, the part dealing with lead in steel. Eurofer does not have a particular position in respect of the other parts of the exemption.

- Documentation provided by stakeholders including replies to the questions above should take the following points into consideration:

  Please justify your contribution according to Article 5 (1) (b) RoHS Directive whereas:

  Substitution of concerned hazardous substances via materials and components not containing these is technically or scientifically either practicable or impracticable;

  The major submission for this request to continue the exemption is an ECSC sponsored research project specifically reviewing known potential replacements for lead in steel. This report was supported by a number of European steel-makers and automotive component producers, so that the report is a representation of best knowledge and practice. The ECSC report identification is 7210.PR306, 'Technically and commercially viable alternatives to lead as a machinability enhancer in steels for automotive component manufacture'. This was submitted to the consultants within the context of the recent ELVD Annex II review but is entirely relevant to the WEEE Annex review.

  Elimination or substitution of concerned hazardous substances via design changes is technically or scientifically either practicable or impracticable;

  Material design considerations are covered in the report identified above (7210.PR306).

  Negative environmental, health and/or consumer safety impacts caused by substitution are either likely or unlikely to outweigh environmental, health and/or consumer safety benefits thereof (If existing, please refer to relevant studies on negative or positive

impacts caused by substitution).

Negative impacts from replacing lead with alternative machinability enhancers are likely to manifest themselves as increased energy costs associated with a reduced effectiveness of that machinability enhancer in comparison with lead. There may also be influences of increased mining activity (through scarcity of supply) for elements that are less easy to recover and less abundant than lead, most notably bismuth.

- Please provide sound data/evidence on why substitution / elimination is either practicable or impracticable (e.g. what research has been done, what was the outcome, is there a timeline for possible substitutes, why is the substance and its function in the application indispensable or not, is there available economic data on the possible substitutes, where relevant, etc.).

  Work has been ongoing over a period of years to ensure that all potential substitutes for lead are considered (see reports already submitted in context of ELVD Annex II review: 7210.PR306 -as above, 117297_0.pdf – Separate Corus evaluation of the use of Tin). Many European steelmakers offer steels with alternative machinability enhancers; however, the volume of leaded steel sold has increased / maintained with the alternative machining options seen as minor/niche sales in comparison.

- Please also indicate if feasible substitutes currently exist in an industrial and/or commercial scale for similar use.

  As per the point above. As an example, Corus sells leaded steels, tellurium treated steels, bismuth treated steels, calcium treated steels, and machinable grades with only sulphur (in contrast to the other listed grades which have sulphur in addition to the other listed machinability enhancers). Leaded steels remain the most popular choice by far, this being reflective of the market need for such products.

- Please indicate the possibilities and/or the status for the development of substitutes and indicate if these substitutes were available by 1 July 2006 or at a later stage.

  All the substitutes referred to above are well known and were available prior to 2006. Although incremental product development raises alternatives that demqnd periodic re-evaluation, there remains no direct replacement for the leaded steels currently sold.

- Please indicate if any current restrictions apply to such substitutes. If yes, please quote the exact title of the appropriate legislation/regulation.

  Please indicate benefits / advantages and disadvantages of such substitutes.

  Please state whether there are overlapping issues with other relevant legislation such as e.g. the ELV Directive that should be taken into account.

  The ELV Directive prompted the original ECSC sponsored work 7210.PR306. This work addressed the issue of lead and machining steels particularly with relevance to automotive applications. However, the characteristics required by machined components are considered in detail by the research, irrespective of the final assembled use of the steel. This is valid as the relevance of lead is to the production process rather than to any final use. Any component produced through

machining is considered to have similar in production requirements such as, reduced cutting force / energy requirement, good surface finish, maximised production rate, good chip (swarf) formation and reduced tool wear.

- If a transition period between the publication of an amended Annex is needed or seems appropriate, please state how long this period should be for the specific application concerned.

  Not relevant as this request is for an existing exemption.

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1. Which applications falling under the scope of the RoHS Directive use these lead containing metals? Please give a comprehensive list of applications or an appropriate grouping of applications.

   End-users rather than steel producers are better placed to answer this question in detail, but in general terms, any of the wide range of highly machined steel components within electrical and electronic equipment are likely to use leaded steel.

2. What is the amount of lead in these applications? Please state the amount of lead used per application, the lead content in the homogeneous material, the annual production volume as well as the number of applications related to exemption 6 put on the EU market annually.

   Corus sells approximately 400kt per annum of low carbon free-cutting steels, and a further 30kt of carbon and alloy steels. Saarstahl produces between 36,000 and 38,000 tonnes per month (equivalent to ~444kt per annum) of leaded low carbon and medium carbon grades. It is not possible accurately to say how much of this material will be used for applications covered by RoHS, due to the length of supply chains and sales to stock-holders and intermediate processors who sell steels to different applications. The lead contents of steels sold by Corus and Saarstahl do not exceed 0.35 wt%.

3. The use of lead as an alloying element in steel, aluminium and copper up to a certain amount is not only exempted under the RoHS Directive, but also under the ELV Directive (Annex II). The exemption under the ELV Directive has just been evaluated. Results can be found in the final report at http://circa.europa.eu/Public/irc/env/elv/library?l=/stakeholder_consultation/evaluation_procedure/reports/final_report&vm=detailed&sb=Title. Please state which of the results and statements are also valid for applications falling under the scope of RoHS.

   The major contribution from European steel manufacturers with respect to their case to preserve the ELVD annex II exemption was based on work comparing the laboratory machinability of different types of steels with a range of different machinability additives. In this context, the work stands alone in assessing the effects of differing machinability additives on known machinability parameters, for example; chip formation, surface tolerance and manufacturing rate. These same

parameters are also directly relevant to machining of steels used in components eventually used in industrial and domestic electrical and electronic equipment. It is also likely that components used in electrical equipment require more than one machining operation to produce their final form. Therefore we believe the evidence concerning suitable replacements for lead that was presented in the context of the recent ELVD Annex II exemption review is directly relevant to this RoHS review.

4. Which applications falling under the scope of the RoHS Directive using these kind of lead-containing metals have different / specific requirements compared to the use in automotive industry?

   The requirement for leaded steels is always associated with the processing used to form specific components and component shapes easily, and with good dimensional tolerance and surface finish. There is significant variety in the meaning of 'good machinability', however it is likely that all parameters are required for both automotive application and applications covered by RoHS - as both applications require similar component characteristics (although the components themselves have a different application).

5. Use of lead as an alloying element in steel: do you support the conclusion given in the above-mentioned report that there currently is no substitute for this use of lead in steel? One particularity of the use in automotive applications was that steels used in the automotive industry go through a variety of machining operations. Thus, the overall performance of steels in the various machinability tests (chip form, tool life and wear, surface finish, tool force, hot workability, deep drilling, etc.) need to be considered. Is this also valid for RoHS related applications?

   As per our response to Question 3. The comparative effects of lead on steel machinability apply, irrespective of the steel's final use. The machining operations relevant to electrical equipment may not be an exact match with the automotive supply chains; however the basic requirement for material that machines well – for example, does not unduly deteriorate tools, produces fine finish and tolerance components and reduces energy usage, will undoubtedly be the same.