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SIEMENS

Automation and Drives

Siemens AG, A&D CD CC SQA, 92220 Amberg, GERMANY

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
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Your letter of
Our reference
Date: HJ
August 17, 2007

— BELGIUM

Request for an exemption with respect to **DIRECTIVE 2002/95/EC ON THE RESTRICTION OF THE USE OF CERTAIN HAZARDOUS SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT (ROHS).**

Dear Sirs,

attached you will find a request for an exemption for the use of lead in solders for the connection of very thin enameled wires with a terminal. Please inform us, if you need any further information.

Sincerely yours,

Holger Jansen
Dr. Holger Jansen

Siemens AG
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Group: Automation and Drives
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WEEE-Reg.-Nr. DE 23691322



EUROPEAN COMMISSION
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**DIRECTIVE 2002/95/EC¹ ON THE RESTRICTION OF THE USE OF CERTAIN HAZARDOUS
SUBSTANCES IN ELECTRICAL AND ELECTRONIC EQUIPMENT (ROHS).**

CHECK LIST FOR REQUESTS FOR ADDITIONAL EXEMPTIONS

Industry has sent to the Commission's services a number of requests for exemptions from the requirements of the RoHS Directive that are additional to those currently covered by the study and the stakeholder consultation. In most cases these are not substantiated by scientific and technical evidence. The proposed check-list will enable the Technical Adaptation Committee (TAC) to carry out a first screening of the requests received. Proposals that successfully pass the screening process will then be considered for a possible exemption.

Article 4(1) of Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment provides 'that from 1 July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, PBB or PBDE.' The Annex to the Directive lists a limited number of applications of lead, mercury, cadmium and hexavalent chromium, which are exempted from the requirements of Article 4(1).

Adaptation to scientific and technical progress is provided for under Article 5 of the Directive. Pursuant to Article 5(1): "Any amendments which are necessary in order to adapt the Annex to scientific and technical progress for the following purposes shall be adopted in accordance with the procedure referred to in Article 7(2):"

Article 5(1)(b) allows the exempting of materials and components of electrical and electronic equipment from Article 4(1) if their elimination or substitution via design changes or materials and components which do not require any of the materials or substances referred to therein is technically or scientifically impracticable, or where the negative environmental, health and/or consumer safety impacts caused by substitution are likely to outweigh the environmental, health and/or consumer safety benefits thereof. These terms of reference mean that the TAC cannot consider exemptions for any other reason, for example a justification based on increased costs.

In order to allow the TAC to consider submissions for additional exemptions, the information in Table I should be provided as a minimum requirement. The request for submissions must fulfil the criteria of Article 5(1)(b). The information provided should be supported, as far as possible, with relevant technical and scientific evidence.

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¹ OJ L 37, 13.2.2003, p. 19

TABLE I – CHECK LIST

**PROPOSALS FOR FURTHER EXEMPTIONS FROM THE REQUIREMENTS OF ARTICLE 4(1) OF
DIRECTIVE 2002/95/EC FOR SPECIFIC APPLICATIONS OF LEAD, MERCURY, CADMIUM,
HEXAVALENT CHROMIUM.**

Submitted by: ORGANISATION NAME Siemens AG, A&D CD, 92220 Amberg, Germany

Criteria	Information: Please provide supporting technical and scientific evidence
<p>1. Please indicate the specific application for which the exemption is requested and indicate a precise and clear wording for the new exemption.</p> <p>Please describe the material/ component of the electrical and electronic equipment that contains the hazardous substance.</p> <p>Please indicate the functionality of the substance in the material of the equipment.</p> <p>Provide a detailed description of the application which explains why the restricted substance is currently required or used.</p> <p>Please indicate the quantity of the hazardous substance present in the whole equipment (Kg).</p>	<p>Connection of enamelled copper wires with terminals by soldering for high-temperature applications in coils for low-voltage switchgear and controlgear. Use of a solder with 37-40% lead instead of a solder with >85% lead as described in point 7 of the attachment of the regulation</p> <p>Two small solder points for connection of the two ends of the enamelled copper wire of a coil to a terminal of an electrically conductive metal</p> <p>The solder has to remove the enamel by thermal decomposition at a temperature above 450°C and to give an electrically conductive, mechanically strong connection</p> <p>The used wires have diameters between 0.03 and 2.5 mm. The enamel cannot be removed mechanically from wires with very small diameters. It has to be decomposed thermally by the hot solder at the connection area. The enamel has a high thermal stability (>180°C) for technical reasons of the application of the coil, so decomposition temperature has to be about 450°C. If leadfree solder is used the copper of the wire is totally solved in the solder and a very brittle connection which does not fulfill the requirements of the application are the results (switching operations with mechanical shocks). This does not happen in the case of solders containing 37 to 92% of lead because of the lower solubility of copper in the solder. For wires with diameters above 0.5 mm the mechanical strength of the connection is insufficient with a solder containing >85 % of lead.</p> <p>20-100mg of solder containing 37 to 40 % of lead within a device with a mass of 100 g up to 1kg</p>
<p>2. Please explain why the elimination or substitution of the hazardous substance via design changes of materials and components is currently technically or scientifically impracticable.</p>	<p>A design change to another connection technology is in progress. Due to extensive tests which have to involve long lasting switching tests (about 30 mio. operations), production planning activities and redesign and investment for highly automated production equipment this will take about 3-4 years before it can be applied in total in the production</p>

Criteria	Information: Please provide supporting technical and scientific evidence
<p>3. Please indicate if the negative environmental, health and/or consumer safety impacts caused by substitution are likely to outweigh the environmental, health and/or consumer safety benefits.</p> <p>If existing, please refer to relevant studies on negative impacts caused by substitution.</p>	<p>The application has no impact on health and helps to ensure consumer safety by proper service of the devices. There is a positive influence of this application on the environment, as the use of 37-40% of lead is better than the use of >85% of lead as allowed under point 7 of the attachment of the regulation</p>
<p>4. Please indicate if feasible substitutes currently exist in an industrial and/or commercial (please provide reference for the substitutes).</p> <p>If substitutes exist on the market, please indicate why they are not used. Please indicate in which applications they are used.</p> <p>Please indicate what efforts are being made by your company to develop alternative techniques.</p> <p>Please indicate if the alternative techniques will be available by 1 July 2006 or at a later stage. If not by that date, please indicate when you expect an alternative to be available?</p>	<p>To our knowledge there is no existing substitute for a soldering connection of high temperature enamelled copper wires. For soldering of lower temperature resistant enamelled wires leadfree solders may be used</p> <p>There are no substitutes on the market for this solder to our knowledge. The only alternative is a solder with high lead content which is worse with respect to environmental influence</p> <p>A design change to another connection technology is in progress. Due to extensive tests which have to involve long lasting switching tests (about 30 mio. operations), production planning activities and redesign and investment for highly automated production equipment this will take about 3-4 years before it can be applied in total in the production</p>
<p>5. Please provide any other relevant information that would support your application for an additional exemption.</p>	<p>See results on leadfree soldering of a project of "Fraunhofer Institut" in: http://www.pb.izm.fhg.de/pcb/DE/40_JTE/Z090_Vorhaben-AIF/WelleReflowBleifrei/index.html</p>

Additional guidelines

To support your application, it may be useful to provide, in addition, an assessment of your application from an independent expert. These should be accompanied by information that will allow the Commission and TAC to be satisfied that the consultant is independent and is qualified to assess the application.

Explain the reasons why potential alternative materials, designs or processes are unsuitable with quantitative data wherever possible. If possible, provide photographs or diagrams to illustrate claims. Sources of information should be referenced where possible.