Adaptation to scientific and technical progress under Directive 2002/95/EC

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Content

1 Background and Objectives

Article 4 (1) of Directive 2002/95/EC on the restriction of the use of certain hazardous sub¬stances 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).

Article 5 (1) (b) of the Directive provides that materials and components can be exempted from the substance restrictions contained in 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 outweigh the environmental, health and/or consumer safety benefits thereof.

On the basis of this provision the Commission has received (and is still receiving) additional requests for applications to be exempted from the requirements of the Directive from industry. These requests need to be evaluated in order to assess whether they fulfil the above mentioned requirements of Article 5 (1) (b). Where the requirements are fulfilled the Commission proposes a draft decision amending the RoHS Directive.

Against this background Öko-Institut e.V. and Fraunhofer Institute for Reliability and Microintegration IZM have been commissioned by the European Commission with technical assistance for the evaluation of requests for exemptions submitted according to Article 5 (1) (b). The main objective of this technical assistance contract consists in a clear assessment of whether the requests for exemptions are justified in line with the requirements listed in Article 5 (1) (b) and in a subsequent recommendation on whether or not to grant the exemption – including a precise wording. These recommendations as well as the description of the proceeding will be included in monthly reports between October 2006 and October 2007.

2 General Procedure

For details on the general procedure please refer to monthly report 1.

3 Scope

On 10 November 2006 the sixth stakeholder consultation round was launched by the Commission and closed on 10 January 2007. The requests open for comments of this sixth consultation round represent the scope of this fifth monthly report and of the current and forthcoming evaluation. Stakeholder comments have been posted on the consultation website concerning requests 1, 7, 15, 18, 22 and 23 as well as one general comment.

Table 1 below gives an overview over the corresponding set 6 of requests for exemption and their current status.

Table 1: Overview status of requests set 6

No.	Title	Applicant	Status
1a	Lead used for shielding of x-radiation emissions for CRT	VDC Display Systems	**WITHDRAWAL 11/12/06**
1b	Hazardous materials and lead in solders in components and assemblies used in non-consumer products	VDC Display Systems	**WITHDRAWAL 11/12/06**
1c	Electronic equipment where reliability, durability and longevity of the equipment is paramount	VDC Display Systems	**WITHDRAWAL 11/12/06**
2	Lead as soldering alloy in high performance communication electronic board and hexavalent chromium (Cr-VI)	Clarity SAS	**WITHDRAWAL 18/12/06**
3	GemCore 410 EMV	Gemplus	Questions sent out 4/12/06. Reply received. Recommendation in process.
4	SAVBIT solder	Roband Electronics PLC	Questions sent out 16/02/07. Reply received. Recommendation in process.
5	Sn-Pb soldering used in Ground-based Aeronautical Communication Equipment Manufacturing	Telerad	Questions sent out 21/3/07. Answers expected until 11/4/07.
6	Transducers used in professional loudspeaker systems, using tin-lead solder	Gemini Sound products Corp.	Draft recommendation possible (see section 5.1)
7	Tin-lead solder in the manufacture of professional audio equipment	Gemini Sound products Corp.	Draft recommendation possible (see section 5.2)

No.	Title	Applicant	Status
8	Inventory of special ICS having tin-lead solder on/in leads/balls, used in specialist/professional equipment	Gemini Sound products Corp.	**WITHDRAWAL 02/01/07**
9	Crystal Stones within the battery operated watch	Zeon Ltd.	**WITHDRAWAL 10/01/07**
10	EEE used for the broadcast and homeland security sector	Tieline Technology	**WITHDRAWAL 26/2/07**
11a	AM186ES-V40 containing lead in used in the leads over plating and AM79C961AKC containing lead in used in the leads over plating	Digigram	Questions sent out 5/12/06. Reply received. Recommendation in process.
11b	Audio board manufacturing process	Digigram	Questions sent out 5/12/06. Clarification on possible withdrawal ongoing.
12	Cadmium sulphide or cadmium selenide in polymer based thin film transistor	Silk Displays Inc.	Questions sent out 5/12/06. Reply received. Clarification on scope issue in progress with Commission.
13	Lead used in the soldering for surface finishing at the electric pole terminal on the electronic parts	ICOM Incorporated	Questions still to be sent out.
14	Cadmium contained in the cadmium oxide of a thick film ceramic substrate	ICOM Incorporated	Questions still to be sent out.
15	All electronics assemblies using lead in solder	RoHSUSA Inc	Draft recommendation given in third monthly report.
16	Lead in electric overblankets for Hot Spot detection	Beurer / Especialidades Eléctricas Daga S.A.	Final recommendation possible (cf. section 5.3).
17	MPC10 used in automatic vending machines to achieve the payment by card	Sagem monetel	Questions sent out 07/12/06. No reply received yet (although two reminders have been sent out). Recommendation in progress with original application document.
18	Hexavalent Chrome Cr-VI when used as a passivate	Amphenol Limited	Questions sent out 09/01/07. Reply received. Recommendation in process.

No.	Title	Applicant	Status
19	Lead contained in circuit boards, obsolete and non-compliant Intel 80c188/86 EA\XL microprocessors, Analog Devices ADMC300 DSP, and NEC uPD7101 DART and hexavalent chromium	NBS Technologies Inc.	Questions sent out 09/01/07. Clarification on inclusion of RoHS scope still in process with applicant.
20	Component used in the manufacture of electric blankets and heating pads	Thermocable (Flexible Elements) Limited	Final recommendation possible (cf. section 5.4).
21	Request to delete exemption for "Lead as impurity in RIG (rare earth iron garnet) Faraday rotators used for fibre optic communications systems	Integrated Photonics	No questions. Recommendation in process.
22	Lead in Trimmer Potentiometer elements	Tokyo Denshi Ltd.	Questions still to be sent out.
23	Cadmium in opto-electronic components	Marshall Amplification plc	Questions still to be sent out.

4 Results

Some requests are currently still being looked at in more depth before sending out questions that need to be answered in order to clarify some aspects of the requests (5). For the other part of the requests questions already have been sent out. Concerning this part most applicants have replied and drafting of recommendations is in progress. Recommendations have been given for request no. 15 (monthly report 3), requests no. 16 and no. 20 (cf. section 5.3 and 5.4) and request 6 and 7 (cf. section 5.1and 5.2).

Most of the evaluation work has up till now consisted in asking the applicants the relevant questions in order to clarify whether (i) the application for which an exemption is requested falls under the scope of the RoHS Directive, (ii) an existing exemption would cover the application concerned and (iii) the use of the substance in an application can be described in more detail. This process sometimes takes up quite extensive e-mail exchanges and telephone calls. The fact that this is nevertheless an important part in the evaluation before beginning with drafting a recommendation is reflected in the many withdrawals (7) that are brought forward by applicants when they subsequently realise that the exemption request is not valid within the context of the RoHS Directive and its exemptions in force.

5 Recommendations

5.1 Use of lead in tin-lead solders for transducers in professional loudspeaker systems – Gemini Sound (set 6 request no. 6)

5.1.1 Description of requested exemption

The applicant applies for the further use of lead in solders for transducers in professional loudspeaker systems.

The applicant manufactures professional loudspeakers, enclosures and systems. Main components are ABS, polywood and transducers with copper voice coils. Voice coils need to be soldered to a terminal using Sn60Pb40 solder.

According to the applicant, the quantity of solder used for each transducer is about 0,5 g depending on the transducer size. This means the use of around 0,2 g of lead per transducer. The weight of the applicant's transducers varies from 0,9 kg to 14 kg resulting in a lead content of 0,00142 % to 0,0222 % per transducer. Based on loudspeaker sales for 2005-2006, the total annual quantity of lead used is less than 48 kg, according to the applicant.

The applicant proposes the following wording for the exemption:

Use of lead in tin lead-lead solders for transducers used in professional loudspeaker systems

5.1.2 Justification for exemption as submitted by applicant and stakeholders

The applicant states that the replacement of lead-containing by lead-free solders has no advantage. According to him, lead-free solders need higher soldering temperatures due to the higher melting points: 227°C for the Sn99.3Cu0.7 (which is stated to be the most used because it is stated to be the less expensive) and 217°C for the Sn96.5Ag3.5Cu instead of 190°C for the Sn60Pb40. The applicant states that this may damage the fragile wires and the speaker paper base cone material.

Furthermore, the applicant argues that lead-free soldering is known to be more fragile. Also the reliability and safety are unproven for the moment. This will be a problem for transducers which need to have very good mechanical characteristics due to oscillations. Any substitute will need many tests and time, and the applicant is not sure that his transducers will have the same reliability in the field that they currently have due to years of field experience with the SnPbAg solder. The applicant says that nothing proves that lead-free solder will have the same long-term reliability as the tin-lead solder currently used. He expects a greater number of loudspeakers back for repair or replacement, and thinks that this will probably have a negative impact on the environment. He also sees this to be in conflict with the WEEE Directive, arguing that if the introduction of lead-free solders makes his products less reliable

than they are now, it is likely that units will have to be recycled more frequently resulting in more electronic waste entering the environment.

Actually, the only substitute known to the applicant are lead free solders for which he has no track record of them being successfully employed in the application relevant for him. The applicant says that no tests have been done with this substitute. The use of an unproven substitute for tin-lead solder without comprehensive testing would result in unresolved issues of product reliability.

The applicant also puts forward that lead free solder is much more expensive than actual tin lead solder. Additionally, the reduced reliability will increase repairs, replacement, shipping costs and thus pollution. Reduced reliability thus will have a considerable, negative effect on his and his customers' business.

The applicant reasons that professional audio equipment is a small sector of the audio market. Reliability is very important for the manufacturer's reputation and the artist's reputation as well as for health & safety reasons, as this audio equipment is built for public space music performances.

The applicant says that he is not a consumer supplier, so that his equipment will have a small impact on consumer's health and that the pollution issues will outweigh the health issues.

5.1.3 Critical review of information as submitted by applicant and stakeholders

The applicant's technical arguments are not specific: they describe general problems as they may occur in the transition towards RoHS compliance in particular with the use of lead-free solders. He says that he has no tests done on these solders for a successful application in his product. Manufacturers, however, are expected to have done the respective tests in order to be ready in time for the implementation of the RoHS Directive on 1 July 2006. For an exemption request, manufacturers also need to prove that they undertook efforts to avoid the use of the restricted substances. The applicant has not provided any such evidence.

The technical problems, which the applicant cites, can be solved. The consultants received confirmations of several manufacturers of professional loudspeakers stating that their products, including the transducers, are fully RoHS compliant:

- Sica Altoparlanti (Sica Guarantee RoHS English.pdf)
- PHL Audio (PHL RoHS Certificate.pdf)
- Precision Devices (PD RoHS Compliance.pdf)
- B&C Speakers (B&C RoHS Status.pdf)
- BMS Elektronik (BMS RoHS Compliant.jpg)

The manufacturing of RoHS compliant transducers for professional loudspeakers thus is technically and scientifically practicable and no justification for an exemption is given according to the criteria mentioned article 5 (1) (b) RoHS Directive.

The applicant puts forward other, non-technical arguments as well. He says that he is not a consumer supplier and that therefore his products cannot have a big influence on consumer health. However, Article 5 (1) (b) does allow for a tolerated amount of any of the restricted substances as an argument for an exemption. Also, the applicant says that possible failures of his products due to the use of lead-free solders in transducers would affect health and safety, as his products are used for music performances in public spaces. It is not plausible, however, why and how a failure of a loudspeaker at a music performance in public spaces should affect public health and safety. The applicant does not give any details on how this could happen.

Further on, the applicant directly or indirectly claims that the substitution of lead in his application would be more adverse for the environment and health than its use. There is, however, no scientific proof for this statement, as has been discussed in the context with exemption request 15 (“Lead in solders and finishes of electrical and electronics devices”, see monthly report 3).

The applicant claims that the use of RoHS-compliant solders may increase failure rates and repair, causing additional waste and thus adding negative environmental impact to his products. He does not give any proof that this problem is intrinsic to the use of RoHS compliant solders, which then might have been an argument for the further use of lead, as the applicant requests. As it is, it must be considered, if it occurs at all, as a transitional problem, which can be solved. Such problems occur due to a general risk related to the use of new techniques and technologies, which every manufacturer must solve for his products, in case the problem occurs at all. The applicant’s argument is too general and unspecific as to allow an exemption according to article 5 (1) (b).

The higher cost for lead-free solders, as also put forward by the applicant, is an economic argument, which is not in line with the requirements of article 5 (1) (b).

5.1.4 Draft final recommendation

It is recommended not to grant the exemption request.

The exemption request is not in line with the requirements of article 5 (1) (b). RoHS compliant professional loudspeakers are available on the market proving that the substitution of lead in this application is technically and scientifically practicable.

The applicant’s environmental and health-related arguments cannot be proven scientifically or are unspecific and of too general nature.

5.2 Tin-lead solder in the manufacture of professional audio equipment – Gemini Sound (set 6 request no. 7)

5.2.1 Description of the requested exemption

The applicant manufactures professional audio equipment, e.g.:

- professional audio mixers
- professional audio CD & MP3 players
- UHF wireless
- audio amplifiers

For all these units the applicant uses solder to attach electronic components to the printed circuit boards. The applicant requests an exemption for the use of tin-lead solder in this application.

The applicant proposes the following wording for the exemption:

Tin-lead solder in the manufacture of professional audio equipment

The applicant estimates an average solder quantity of 12 g of tin-lead solder per unit with 40 % of lead and the rest being tin. This means 4,8 g of lead per unit.

Based on the applicants sales in 2005-2006 for all his 3 product brands (Gemini, iKEY Audio), the applicant calculates a total amount of lead use of less than 300 kg per year.

5.2.2 Summary of justification for the exemption

5.2.2.1 Applicant's criteria for justification

The applicant says that the replacement of lead by lead-free solders has no advantage. It needs higher temperatures due to the elevated melting points of the lead-free solders (227°C for the Sn99.3 Cu0.7 which would be the most used because being the less expensive, and 217°C for the Sn96.5 Ag3.5 Cu0.9, instead of 190°C for the Sn60Pb40). The applicant argues that these elevated soldering temperatures may damage integrated circuits and sensitive electronic components on the printed wiring boards.

Further on, he puts forward that lead free soldering would be known to be more fragile and that reliability and safety are unproven for the moment. He fears that this could be a problem for heavy components, high current signals, (e. g. in amplifiers a bad soldering may cause a bad contact or a spark), broken connections due to unit transportation, shock (his equipment is also used for mobile use and not only for fixed installation) etc.

According to the applicant, nothing proves that lead-free solders have the same long-term reliability as the tin-lead solder currently used, so that he expects a greater number of his equipment back for repair or replacement. The applicant asserts that this will certainly have a negative impact on the environment. He argues that an increased amount of waste equipment seems to be in conflict with the WEEE Directive: if the introduction of lead-free solders makes his products less reliable than they are now, it is likely that units will have to be recycled more frequently resulting in more electronic waste entering the environment.

Actually, the only substitute known to the applicant are lead-free solders for which he has no track record of them being successfully employed in applications relevant to him. He claims that no tests have been done with these substitutes. The applicant is afraid that the use of an unproven substitute for tin-lead solder without comprehensive testing would bring with it unresolved issues of product reliability. Testing the substitutes will need many tests and time, and the applicant is not sure that his equipment will have same reliability in the field that it has currently from the applicant's years of field experience with the tin-lead solder.

The applicant states that professional audio is a small sector of the audio market, where reliability would be very important for the manufacturer's and the artist's reputation, also for health & safety reasons, as the audio equipment is built for music performances in public spaces.

The applicant says that lead-free soldering is much more expensive than actual tin lead solders, and that the reduced reliability would increase repairs, replacement and thus shipping costs. Additionally, if reliability is affected negatively, the effect on his business and those of his customers would be considerable.

5.2.2.2 Critical review of data and information given by the applicant or stakeholders

According to the applicant, the use of lead-free solders has many disadvantages. Article 5 (1) (b), however, requires to prove that the substitution is technically and scientifically impracticable and/or that negative environmental, health and/or consumer safety impacts caused by substitution are likely to outweigh the environmental, health and/or consumer safety benefits thereof. The applicant does not give any details on how and why this should be the case.

The applicant's technical arguments are unspecific and describe general problems as they may occur in the transition towards RoHS compliance in particular with the use of lead-free solders and as all manufacturers had to solve them until 1 July 2006. It seems that these problems can be solved as many other manufacturers have shown capability of RoHS compliance in this field. In case the applicant has a problem with temperature sensitive integrated circuits, as he states, he is expected to replace these components by RoHS compliant ones that are qualified for higher soldering temperatures. If such components for some reasons are not available, selective soldering of temperature sensitive components might be another way to RoHS compliance.

The applicant says that no tests have been carried out on these solders with regard to a successful application in his product. Manufacturers, however, are expected to have done the respective tests in order to be ready for RoHS compliance with appropriate products until 1 July 2006. For an exemption request, manufacturers also need to prove that they undertook efforts to avoid the use of the banned materials. The applicant says that such tests would be expensive and time consuming and has not made any test results available.

The applicant's technical justification for the exemption request does not suffice the requirements of article 5 (1) (b) in order to obtain an exemption.

The applicant puts forward other, non-technical arguments as well. He says that he is not a consumer supplier and that therefore his products cannot have a big influence on consumer health. However, Article 5 (1) (b) does allow for a tolerated amount of any of the restricted substances as an argument for an exemption. Also, the applicant says that possible failures of his products due to the use of lead-free solders in transducers would affect health and safety, as his products are used for music performances in public spaces. It is not plausible, however, why and how a failure of a loudspeaker at a music performance in public spaces should affect public health and safety. The applicant does not give any details on how this could happen.

Further on, the applicant directly and indirectly claims that the substitution of lead in his application would be more adverse for the environment and health than its use. The applicant does not give any proof for this statement. Generally, such proofs are not available, as has already been discussed in the context with exemption request 15 ((“Lead in solders and finishes of electrical and electronics devices”, see monthly report 3).

The applicant claims that the use of RoHS-compliant solders may increase failure rates and repair, causing additional waste and thus would add to the negative environmental impact of his products. He does not give any proof that this problem is intrinsic to the use of RoHS compliant solders, which then might have been an argument for the further use of lead, as the applicant requests. As it is, it must be considered, if it occurs at all, as a transitional problem, which can be solved. Such problems may be a general risk related to the use of new techniques and technologies, which every manufacturer must solve for his products in case the problem occurs at all. The applicant's argument is too general and unspecific as to allow an exemption according to article 5 (1) (b).

The higher cost for lead-free solders, as also put forward by the applicant, is an economic argument and thus not in line with the criteria of article 5 (1) (b).

5.2.3 Draft final recommendation

It is recommended not to grant the exemption request.

The applicant did not prove that he has undertaken the necessary steps to achieve RoHS compliance. His arguments are general, unspecific, in parts implausible and the applicant has not submitted any supporting evidence. The applicant's exemption request thus does not suffice the requirements of article 5 (1) (b).

5.3 Lead in electric overblankets for Hot Spot detection – Beurer (set 6 request no. 16)

5.3.1 Description of requested exemption

The company Beurer requests an exemption for the use of lead in PVC used for the insulation of heating wires in flexible heating overblankets. The applicant considers flexible heating overblankets to belong to category 2 WEEE Directive. Heating overblankets are – unlike heating pads or underblankets – often used in a folded or rucked way[1]. The lead doped PVC is a conductive plastic material which is used for the detection of so-called hot spots. These occur when the heating overblanket is folded or rucked and an overheating takes place. Such an overheating may lead to skin burns.

An overheating can take place in two ways:

1. Either the heating wire is folded in such a way that in the areas of bending (thermal and mechanical stress), the plastic will melt thus causing a short circuit (preventing harm for the user since then current does no longer run and the appliance stops heating) or
2. the heating overblanket is folded in such a way that several layers of heating wire are on top of each other thus leading to local temperatures of around 90 – 100°C which may cause skin burns.

The hot spot detection is necessary for the second case.

The European Standard EN 60335-2-17 is applicable for flexible heating appliances and defines tests conditions to insure the safety of flexible heating appliances during normal use and foreseeable misuse. The standard calls for the „most unfavourable folding condition" during test. According to Beurer flexible heating overblankets can only meet the standard's requirements if they have hot spot detection.

According to the applicant, he (Beurer) and the Spain-based manufacturer Daga own 90% of the European market for heating overblankets. Beurer says to have put all overblankets concerned by the RoHS Directive to the EU market before the closing date of 1 July 2006.

[1] As opposed to heated underblankets which are designed to be placed flat on the mattress, heated overblankets are designed to be wrapped around the user.

Beurer uses heating wires manufactured by “Thermocable” (cf. set 6 request no. 20) and “Heatsolve”. Both have started research for alternatives where not PVC but another conductive plastic material not containing lead would be used. However, these alternatives are not yet on the market. Beurer expects to be able to purchase an alternative by end 2007 / beginning 2008 thus using this alternative in time for the 2008 production. An exemption is requested for the 2007 and part of the 2008 production.

The annual production volume of blankets with lead-containing heating wire in the EU is estimated by Beurer to be approximately 80.000 blankets with 1,5 kg each. The amount of lead per blanket is 0,4 grams. The corresponding annual amount of lead within these blankets is thus approximately 30-40 kg.

The wording proposed by the applicant is: “Lead in PVC used for giving a Negative Temperature Coefficient (NTC) behaviour to the PVC for the detection of hot-spots in flexible electric heating overblankets”.

5.3.2 Justification for exemption as submitted by applicant and stakeholders

The applicant justifies his exemption request according to the following technical and safety arguments:

- Currently there is no alternative (lead-free) plastic material on the market delivering hot-spot detection for flexible electric heating overblankets.
- Skin burns due to overheating of overblankets in folded or rucked condition can only be prevented by using a hot-spot detection system.
- For flexible electric heating overblankets, the fulfilment of the standard EN 60335-2-17 regarding the therein specified test conditions (“most unfavourable folding condition“) can only be achieved with an integrated hot-spot detection system.

5.3.3 Critical review of information as submitted by applicant and stakeholders

A critical review of the documents made available by the applicant and of further data and information given by other parties lead to the following observations and conclusions:

- The applicant has made clear with complete and comprehensive documentation that there currently is no lead-free alternative on the market for a hot-spot detection system to be used in flexible electric heating overblankets in order to prevent skin burns during use.
- Although there is no legally binding regulation prescribing the use of such a hot-spot detection system in the mentioned application, the applicant has justified the necessity of preventing overheating in such a way with valid arguments.
- There might be products on the market which wear the CE mark signalling conformity with EU legislation and standards that do not use such hot-spot detection. However, the applicant has made clear that these products represent a safety risk for the user

and that these products represent a very small part of the market (thus not having to fear negative image problems should safety of users be endangered).

- Substitutes seem to be under development leading to the conclusion that in this case it is rather the question of phasing-out the use of lead in the short term rather than needing a long-term exemption.
- The argument that user safety can only be guaranteed with NTC hot-spot detection has not been confirmed by the heating wire supplier Thermocable (cf. set 6 request no. 20). However, Thermocable has stated that an NTC hot-spot detection is the only system, that allows the device to be still operational after overheating has taken place while other safety systems (e.g. using an additional layer of low-melting polyethylene that would lead to melt-down in case of overheating and thus causing a short-circuit) would lead to failure of the device.
- Additionally Thermocable did also not confirm that the requirements of the standard EN 60335-2-17 can only be met with NTC hot-spot detection for overblankets. However, here again, the argument of prolonging product life has been brought forward by Thermocable.

5.3.4 Final recommendation

Concluding on the above justification and critical review and in analogy to the recommendation given for exemption request no. 20, it is recommended to grant the exemption. Since substitutes will probably be available by latest mid 2008 it is however recommended to limit the exemption in time. The recommended wording of the exemption is thus (in line with the one recommended for exemption request no. 20):

“Lead in PVC used for giving a Negative Temperature Coefficient (NTC) behaviour to the PVC in view of electronic shut down control of flexible electric heating appliances (overblankets, heating pads and underblankets) until 1 July 2008.”

The applicant has agreed to this wording.

5.4 Component used in the manufacture of electric blankets and heating pads – Thermocable (set 6 request no. 20)

5.4.1 Description of requested exemption

The company Thermocable requests an exemption for the use of lead in Negative Temperature Coefficient (NTC) PVC used for the manufacture of heating wires used in flexible heating appliances (overblankets, heating pads, underblankets). The applicant considers flexible heating appliances to belong to category 1 WEEE Directive.

Flexible heating appliances operate at a certain temperature (e.g. 65°C - 70°C for overblankets). In cases where such flexible heating appliances are folded or rucked, the temperature can rise considerably (e.g. up to 160°C in one hour when blanket is 3-fold). The European Standard EN 60335-2-17 requires flexible heating elements to fail safe prior to 165°C in order to prevent skin burns[2]. According to Thermocable, this requirement can be met in different ways:

- Either an additional low-melting polyethylene layer is used that melts down at around 120°C – 130°C thus causing the device to shut down but also resulting in the device not being operational anymore or
- The NTC hot spot detection system is used which electronically shuts down the appliance at around 110°C before a melt-down takes place thus allowing the product to be further used[3].

In the first case, according to the applicant, devices will usually fail within the first two years of use. Although Thermocable admits that this is more probable for overblankets than for underblankets. Hence, the second possibility is particularly used for overblankets.

Thermocable estimates the annual amount of lead used in flexible heating appliances in the EU to be approximately 26kg and 0,468 g per blanket.

Thermocable has started research for alternative materials as well as substitution of lead in the NTC/PVC[4]. Although R&D efforts have started late in the RoHS implementation process (mid 2005[5]), the applicant is confident that an alternative will be ready for market use within the next 18 months.

The applicant has not proposed a wording. The following wording was submitted to the applicant for agreement: “Lead in PVC used for giving a Negative Temperature Coefficient (NTC) behaviour to the PVC in view of electronic shut down control of flexible electric heating appliances (overblankets, heating pads and underblankets) until 1 July 2008”.

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2 It defines tests conditions („most unfavourable folding condition“) to insure the safety of flexible heating appliances during normal use and foreseeable misuse. The standard does not give guidance to what means are used to achieve the fail safe requirement.

3 Statement Thermocable: “The PVC/NTC has particular repeatable characteristics than can be electronically measured and used to switch off the heating appliance at any desired temperature prior to 165°C without activating the final safety circuits, which means the heating appliance can be still operated once the abnormal condition is removed.”

4 Substitution of lead in PVC without NTC characteristics is already being done according to the applicant. Only the substitution of lead in PVC with NTC characteristics is not yet feasible.

5 The applicant argues that due to an unclear or misleading interpretation of „homogeneous material“ it was not clear that the amount of lead in PVC would exceed maximum concentration values.

5.4.2 Justification for exemption as submitted by applicant and stakeholders

The applicant justifies his exemption request according to the following technical, environmental and safety arguments:

- Currently there is no alternative (lead-free) plastic material on the market delivering NTC characteristics for flexible electric heating appliances. Lead substitutes lead to problems with the long-term stability of the plastic material and problems in the extrusion process due to the material having low melting temperature. Therefore research efforts rather go in the direction of materials other than PVC able to deliver NTC characteristics without the use of lead.
- The safety characteristics delivered by NTC prolong the lifetime of the product since the product does not fail when overheating takes place but can rather be shut down in a controlled way thus making further use of the appliance possible.
- NTC/PVC allows for additional safety also for heating pads and underblankets.
- The amount of lead in the heating wire is very small. Thus, negative environmental effects due to the use of lead are supposed to be outweighed by the negative environmental effects due to appliances failing because of overheating (i.e. shortening product life).
- A phase-out period is required for the use of lead in NTC/PVC meaning that an exemption can be limited in time.

5.4.3 Critical review of information as submitted by applicant and stakeholders

A critical review of the documents made available by the applicant and of further data and information given by other parties lead to the following observations and conclusions:

- The applicant has made clear with complete and comprehensive documentation that there currently is no lead-free alternative on the market for a NTC/PVC to be used in flexible electric heating appliances in order to prevent devices to fail safe by melt-down.
- Although there is no legally binding regulation prescribing the use of such NTC/PVC in the mentioned application, the applicant has justified the necessity of preventing overheating in such a way with valid arguments.
- The applicant delivered information on efforts made for the development of alternatives leading to the conclusion that in this case it is rather the question of phasing-out the use of lead in the medium term rather than needing a long-term exemption.
- Ensuring a long product life and guaranteeing a maximum level of safety for the use of electric heating appliances is in line with Article 5 (1) (b).

5.4.4 Final recommendation

Concluding on the above justification and critical review, it is recommended to grant the exemption. Since substitutes will probably be available by latest mid 2008 it is however recommended to limit the exemption in time. The recommended wording of the exemption is thus:

“Lead in PVC used for giving a Negative Temperature Coefficient (NTC) behaviour to the PVC in view of electronic shut down control of flexible electric heating appliances (overblankets, heating pads and underblankets) until 1 July 2008.”

The applicant has agreed to this wording.

6 Further proceeding

The next step will be to finalise sending out the first questions to applicants (for 5 of the 23 requests). Furthermore, recommendations for the requests for which they are already in progress will be finalised as well as clarifications on scope issues.

The next monthly report is scheduled for 24 April 2007.