

Stakeholder Questionnaire

1. Background

Hazardous substances in Electrical and Electronic Equipment (EEE) are regulated by the RoHS Directive 2011/65/EU (RoHS 2). According to article 6(1) it is possible for member states to submit a proposal for adding new substances to the list of restricted substances of the directive. Article 6(1) and 6(2) describe the criteria and requirements for proposals for restrictions respectively.

In 2014 the Danish EPA performed a survey on brominated flame retardants (BFRs). On the basis of its results, the Danish Technical University (DTU Food) investigated possibilities of grouping BFRs. One of the groupings; the small linear and branched brominated alkyl alcohols (hereinafter SBAA), including:

- 2,3-dibromo-1-propanol (2,3-DBPA);
- 2,2-bis(bromomethyl)-1,3-propanediol (DBNPG); and
- 2,2-bis-(bromomethyl)-3-bromo-1-propanol (TBNPA);

was chosen for further investigation and the grouping was extended to include also theoretical compounds. The category, defined as having 3-5 carbons, 2-3 bromine atoms and 1-2 alcohol groups, comprises 61 members. Predictions for carcinogenic and mutagenic/genotoxic properties indicated that the 61 members in the category of small linear and branched brominated alkyl alcohols have a carcinogenic potential with a possible mutagenic/genotoxic mode of action. Experimental data for a small number of the members of the group is available. The experimental data support the (Q)SAR prediction.

The Danish EPA has thus commissioned a project to collect, assess and present scientific data to support a proposal for restriction of small brominated alkyl alcohol in the RoHS Directive, if the data prove to be adequate. Oeko-Institut for Applied Ecology and COWI AS have been requested by DEPA to perform the evaluation.

For this purpose, a stakeholder consultation is being held as a means of collecting further information and data as to the substances of interest and their relevance to the EEEE sector. A background report has been prepared for the consultation, to provide stakeholders with a first basis of relevant data and information on the substances of interest. This information shall be supplemented by further information to be provided from various sources.

The objective of this consultation and the review process is thus to collect and to evaluate information and evidence for the preparation of a substance assessment dossier for the small brominated alkyl alcohol (SBAA) group, based on the dossier template¹ proposed by the Austrian Umweltbundesamt GmbH, and based on the applications in which SBAA's are in use in general and in EEE, as well as the range of quantities in which they are applied.

¹ Please see proposed template under:
http://rohs.exemptions.oeko.info/fileadmin/user_upload/RoHS_Substance_Review/Diisobutylphthalate/RoHS_AnnexII_Dossier_May_2013.docx

The following questions have been formulated to gather more information in this regard. Input provided shall be used to prepare a substance group assessment dossier for SBAA. If you would like to contribute to the stakeholder consultation, please answer the following questions. In case parts of your contribution are confidential, please clearly mark relevant text excerpts or better yet, provide your contribution in two versions (public/confidential).

2. Questions

1. Contact Information:

Name: _____

Organisation: _____

E-mail: _____

Telephone: _____

2. Area of activity (more than one is possible):

- ☐ Industry
- ☐ Retail/distribution
- ☐ Rent/repair business
- ☐ Industry/business association
- ☐ RoHS enforcement
- ☐ RoHS analysis
- ☐ Environmental NGO
- ☐ Consumer NGO
- ☐ Institute/consultancy
- ☐ EU Member State Representative
- ☐ International agency / organisation
- ☐ Other (please specify): _____

3. Applications in which small brominated alkyl alcohols are in use:

The following uses have been found in the literature for a number of substances from the “small linear and branched brominated alkyl alcohol” group:

- **Materials:** Used in epoxy, polymers, polyester resins, polyvinyl, phenolic resins, styrene-butadiene rubber (SBR), and latexes, polyester, as additive in polystyrene foams (EPS), in the production of rigid polyurethane (PUR /PU) foam, in the preparation of flame retardants for plastics and synthetic fibers;
- **Applications:** Used in insecticides, and pharmaceuticals, in cellulosic acetate fabrics and acrylic fabrics, in paper coatings, paints, clothing, insulation, furniture, automobile interior parts & water floatation devices, packaging, draperies, institutional bedding, toys, doll clothing, wigs, mobile phones, unsaturated polyester sheets in roofing. Possible use in resins (epoxy, phenolic) used for encapsulation in capacitors, power supplies, etc.

a) Please provide information concerning products and applications in which small brominated alkyl alcohols are in use, or used in conjunction with other substances for example in the manufacture plastics or of resins. Possibly provide input in tabular form, referring to the following:

- I. Which substance is used (see Annex I)?
- II. Is the substance used as intermediate (reactive) or as additive in the named application?
- III. Quantity/concentration of substance used (weight and % weight in the homogenous material).
- IV. Is application relevant to the EEE sector or not?
- V. Does manufacture take place in the EU or elsewhere?

b) From the available information reviewed so far, it seems that the use of small brominated alkyl alcohols in EEE is more common as a constituent of various resins, for example of epoxy resins, phenolic resins, etc. This is also supported by the physical-chemical properties of most of the substances in the group and their tendency to vaporize.

- I. Do you support this view?
- II. Please provide information to support your view.

c) In a few cases, substances of the group have a larger molecular structure as well as higher melting and boiling point. Information supports that such substances may be in use in the production of plastic parts made of polymers such as polyurethane.

- I. Do you support this view?
- II. Please provide information to support your view.

4. Umbrella specifications:

From umbrella specifications², published by the German Electrical and Electronic Manufacturers Association (ZVEI), it can be understood that the following components make use of various types of resins.

Title	Product class	Product part (IMDS: semi component)	Material (IMDS Material)	Material/ Substance
Metallised Film Capacitor for EMI Suppression Class X2	Metallised Polypropylene	Encapsulation	Polymer	PU/Epoxy
			Hydroxide	Al(OH)3
			Polymer	PBT
			Oxide	Sb ₂ O ₃
			Flame retardant	Equivalent Br
Metallized Film Capacitor	Film Chip Capacitor ECHU (X)	Active part	Polymer	Thermosetting resin
		Termination	Polymer	Phenolic resin
Metallized Film Capacitor	Film Chip Capacitor ECPU (A) / ECWU (X)	Termination	Polymer	Phenolic resin
NTC	Leaded Disks	Encapsulation	Organic Polymer	Lacquer [1] or Epoxy Resin [2]
NTC	Miniature Sensor insulated leads	Leads	Organic Polymer	PTFE / other thermoplastic polymer
		Encapsulation	Organic Polymer	Epoxy Resin
NTC	Miniature Sensor uninsulated leads	Encapsulation	Organic Polymer	Epoxy Resin
Inductive components class A -Ω	S22	Active Part	Metall (wire)	Cu PUR etc.
		Plastic	Duroplaste	EP, PA, PUR, PET, PBT, Silicone, etc.
		(Insulation, Encapsulation and Potting)		Fiber-glass, Flame-retardant*, Additive*
Varistor	Disk Varistor	Encapsulation	Organic Polymer	SiO ₂
				Epoxy Resin
				Brominated epoxy
				Sb ₂ O ₃
				Additives*)
PTC	Switching Applications	Encapsulation	Organic Polymer	PBT GF(30) FR(17)

² See: <http://www.zvei.org/Verband/Fachverbaende/ElectronicComponentsandSystems/Seiten/Umbrella-Specifications.aspx>

- a) The specifications have been screened in reference to the mention of specific materials in which the use of SBAA is understood to be common. It has been assumed that the specifications are comprehensive in relation to the component for which they have been prepared. However please specify:
- I. If further use of SBAA is made in these components (for example where manufacture may differ).
 - II. Additional components where SBAA are in use in EEE. Especially for example in transformer sockets, in sealing, etc.
- b) It is understood that small brominated alkyl alcohols can be used as constituents for the manufacture of resins such as those detailed above. Please refer to Annex I of this document (list of small brominated alkyl alcohols included in the group under review) and detail:
- I. Small brominated alkyl alcohols in use (or in use in the past) in the manufacture of the components mentioned above as well as the quantities and concentrations in which these substances are applied (data can be provided in tabular form for example as proposed below).
 - II. If your view is that other constituents are used to manufacture resins for such components, please clarify what constituents are used.

Product part (IMDS: semi component)	SBAA in use		Constituents applied	Quantity used in manufacture (amount or range)	Quantity and form of pre- sence in final component	Concentration as %weight of component / homogene- ous material	Main region of manu- facture
Encapsulation	Yes / no / in the past	Additive- /reactive	xx-xxx-xx	(specify for component / on the EU market)	(specify amount for component/ on the EU market / CAS)	(specify)	EU/ Asia/ USA/ specify if other
			xx-xxx-xx	(specify)	(specify amount and CAS)	(specify)	
Termination	Yes / no / in the past	Additive- /reactive	xx-xxx-xx	(specify)	(specify amount and CAS)	(specify)	EU/ Asia/ USA/ specify if other
			xx-xxx-xx	(specify)	(specify amount and CAS)	(specify)	
			xx-xxx-xx	(specify)	(specify amount and CAS)	(specify)	
(Specify)...							

5. Alternatives and possible substitutes for small brominated alkyl alcohols:

- a) Where the substitution of small brominated alkyl alcohols is already underway in the various applications, please elaborate which chemical or technological alternatives may be relevant for this purpose.
- b) How is the trend of use expected to change over the coming years.
- c) Please provide details for alternatives in relation to toxicity aspects, comparability in relation to various properties, relevant areas of application, etc.
- d) Please provide data and information as to the costs of substitution relevant for various applications (costs of alternatives, costs of adaptations to design, etc.). If relevant, please estimate how this may impact the industry sector active in the manufacture of the various applications (manufacturers, suppliers, etc.) as well as other actors (retailers, consumers, etc.).
- e) If relevant, please elaborate on areas where substitution is difficult. In this regard please explain what efforts have been made and provide information and test results to support why substitution is not feasible at this time.
- f) Please provide information whether substances of the “small linear and branched brominated alkyl alcohol” group may be used as substitutes for other brominated flame retardants, particularly those used in EEE components and products.

6. End-of-Life of EEE containing small brominated alkyl alcohols:

- a) Please provide information as to the treatment of waste EEE (WEEE) containing small brominated alkyl alcohols. In this respect please refer to:
- b) Practiced treatment methods for WEEE; including collection and treatment practices relevant for specific products and/or components (for example, printed circuit boards);
- c) Risk of emissions or releases during treatment;
- d) Risks of emissions or releases of small brominated alkyl alcohols from WEEE, when treated improperly (for example open combustion).

In case parts of your contribution are confidential, please clearly mark relevant text excerpts or provide your contribution in two versions (public / confidential).

Finally, please do not forget to provide your contact details (Name, Organisation, e-mail and phone number) so that Oeko-Institut can contact you in case there are questions concerning your contribution.

Thank you.