Response to 1st Questionnaire (Clarification Questionnaire) Exemption No. 7c(I) (renewal request)

Exemption for „Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound“

Name and contact details of responsible person for the application and response

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The response to the 27 July 2015 Oeko-Institute questionnaire is submitted on behalf of the participating industry associations and companies listed below:

DIGITALEUROPE ID number: 64270747023-20	DIGITALEUROPE	**European Garden Machinery Industry Federation (EGMF)** ID number: 82669082072-33	EGMF	**IPC – Association Connecting Electronics Industries**	IPC	**Ferro Corporation**	FERRO
Electronic Components Industry Association (ECIA)	ecia	**European Partnership for Energy and the Environment (EPEE)** ID number: 22276738915-67	EPEE	**Japan Business Council in Europe (JBCE)** ID number: 68368571120-55	Japan Business Council in Europe	**Knowles (UK) Ltd**	knowles
European Ceramic Industry Association (Cerame-Unie) ID number: 79465004946-12	Cerame-Unie	**European Passive Components Industry Association (EPCIA)** ID number: 22092908193-23	EECA EPCIA	**ZVEI - German Electrical and Electronic Manufacturers´ Association** ID number: 94770746469-09	ZVEI: Die Elektroindustrie	**PI Ceramic**	PI
European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR); ID Number: 05366537746-69	COCIR	**European Semiconductor Industry Association (ESIA)** ID Number: 22092908193-23	ESIA	**Avago Technologies Ltd**	AVAGO TECHNOLOGIES	**Meggitt Sensing Systems**	MEGGiTT
European Committee of Domestic Equipment Manufacturers (CECED) ID number: 04201463642-88	ceced	**Information Technology Industry Council (ITI)** ID number: 061601915428-87	Information Technology Industry Council	**Diodes Incorporated**	DIODES		

Question 1

In the 2008/2009 review of the Annex to Directive 2002/95/EC (predecessor of today's RoHS Directive 2011/65/EU), the following applications were identified for ceramics containing lead:

i. PZT ceramics
ii. Dielectric ceramics
iii. PTC ceramics
iv. Thickfilm technology

Please add other applications of lead in ceramics and in glass, in particular transforming the functional descriptions of lead in glass on page A5-1 of your exemption request into application-oriented uses like thickfilm technologies, etc., even though this list might not reflect all uses of lead in glass.

Answer to Q1

The applications of lead-containing ceramic and glass, are numerous and varied, and adding to that there are many cases in which uses fall simultaneously into several different applications. Therefore, it is impossible to provide a complete list including all applications. Compared to 2008 inputs, no new applications were identified, and none of these applications can be replaced by a lead free alternative in the foreseeable future. Thus, we were requesting renewal of exemption 7c(I) with the following proposed wording: "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in discrete capacitor components, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound" for categories 1 to 7, 10 and 11 of Annex I for an additional validity period of 5 years. For these categories, the validity of this exemption may be required beyond this timeframe.

The following Table shows examples of the applications of lead in ceramic, glass and glass-ceramic matrix compounds under the scope of exemption 7c(I). The references are related to the exemption request form.

Application	Function	Product examples	Reference
Ceramic (including applications using thick film & thin film technology)			**Annex 1**
PZT in piezoelectric ceramic	Piezoelectric effect	Transformer, filter, resonator, buzzer, actuator, sensors (pressure, shock)	**Annex 2**
Semiconductor ceramic (PTC)	Temperature dependent resistance	PTC resistor / thermistor, heater	**Annex 3**
Pyroelectric ceramic	Pyroelectric effect	Infrared sensor, temperature sensor	
Ferroelectric /magnetic ceramic	Ferroelectric / Magnetic effect	Ferroelectric memories, ferrite core	
Dielectric ceramic	Energy storage by polarization effect	Capacitive layers in electronic components (discrete capacitor components are in scope of 7c(II) and 7c(III))	
Glass and glass-ceramic matrix compounds (including applications using thick film & thin film technology)			**Annex 4**
Glass and/or glass frits for amorphous isolating solid or interconnection	Protection, Insulating	Discrete Semiconductors	**Annex 5**
		Glass passivation of semiconductor chips	
		Glass sleeve diodes (various sizes)	
		Thick film resistors	
		Wire wound resistors	
		NTC – Glass coating	
		Metal pressure sensors	
	Adhesives / Bonding	MEMS	
		SMD Components	
		Capacitive pressure sensing element	
		Resistive pressure sensing element	
	Hermetic sealing	Electronic components with hermetically sealed ceramic package	
Glass-ceramic matrix compound	Functional glass compound, resistance	Thick film resistors coating, resistance and conductor layer	
		High voltage resistors	
		Outer electrode of ceramic components	
Glass-ceramic material	Functional glass	Glass-ceramic cooking field	
Disclaimer: The above are illustrative examples and they do NOT constitute a comprehensive list of the uses of lead in ceramics and in glass used in electrical and electronic components.			

Question 2

You indicate the amount of lead entering the EU market under exemption 7c-I with around 350 t per year.

a) Please substantiate this estimate with a calculation.

b) The figures are based on data from the major players in the EU market. Could you please indicate the approximate market share of these companies?

Answer to Q2

The amount of lead was calculated as lead equivalent based on the 2013 yearly ceramic and glass production volume as reported by the major EU manufacturers, reduced by 50%, which is the amount known to be used in automotive applications (ELV). It is an extremely worst case estimation, since part of the amount of 350 t may be contained in products which are exported from the EU, or in products falling not under the scope of the RoHS, or the ceramic and glass material is not used for the production of electric and electronic components.

Electrical and electronic components are used in a wide range of final products and markets, it is impossible to provide a precise figure of the amount of lead included in glass and ceramic components in the EU for Electrical and Electronic Equipment [EEE].

It should be noted that there may be components with lead-containing glass and ceramics which are not included.

For this reason, although the estimates were done in good faith with the data resources available, the values shown here are provided strictly for reference purposes.

More accurate figures cannot be provided.