

## 1st Questionnaire Exemption Request No. 2014-2

### ***Exemption for „Lead in solders used to make electrical connections to temperature measurement sensors designed to be used periodically at temperatures below - 150 °C“***

#### **Background**

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract<sup>1</sup> for the evaluation of an application for granting an exemption to be included in or deleted from Annexes III and IV of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.<sup>1</sup>

Lake Shore Cryotronics has submitted the above mentioned request for exemption, which has been subject to a first evaluation. As a result we have identified that there is some information missing and ask you a few questions to clarify concerning your request before we can start the online consultation. Please answer the questions until 10 October 2014 latest.

#### **Questions**

1. You consider information about the amount of lead used in your products under the potential future exemption as confidential as it would allow concluding on your market share. As exemptions cannot be granted based on minor amounts of lead used, this is acceptable. We would, however, like to indicate at least the magnitude of lead. We propose indicating that the amount of lead used is far below 10,000 g per year on the European market. If you do not agree to that threshold, please propose a different magnitude of lead use on the European market under the exemption, whose publication you consider as uncritical.  
*Yes, we agree that the amount of lead is far below 10,000 g per year on the European market.*
2. What do your sensors measure? Only temperature, or other physical quantities as well?  
*The sensors for which we are requesting this exemption measure only temperature.*
3. Do you agree that exemptions in Annex IV already cover at least part of your sensor applications?
  - a. For permanent use of the sensors under -20 °C (exemption 26)  
*Yes*
  - b. For use close to or in magnetic fields in magnetic resonance imaging equipment, and in cyclotron magnets, magnets for beam transport and beam direction control (exemption 27, in parts also covering requirements for nickel-free soldering).

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<sup>1</sup> Contract is implemented through Framework Contract No. ENV.C.2/FRA/2011/0020 led by Eunomia

Yes

c. Any other exemptions?

*We do not know of any other applicable exemptions.*

In case you do not agree, please explain the background of your statement.

4. Your exemption request is based on the following main properties of tin-lead alloys compared to alternative materials, and combinations and consequences thereof:

- Inhibition of tin-pest
- Ductility of tin-lead solders at low temperatures
- Low electrical resistivity within the temperature range
- Higher resistance to oxidation and corrosion in the intended operating environment
- Higher resistance to tin whisker formation on electroplated tin coatings
- Higher resistance to thermal fatigue
- Solderability on non-magnetic, nickel-free terminals
- Resistance to vibration
- Reduced intermetallic layers, better aging behaviour

All of the above aspects are either already fully or at least partially covered by exemptions, or would apply to other manufacturers' sensors as well, who have not asked for an exemption.

a. Please explain what makes your sensors or their applications unique and different from all other sensors in the market to a degree that justifies your exemption request in the absence of support from other manufacturers.

*Our customers' processes require our sensors to be robust and reliable for decades while being cycled from room temperature to cryogenic temperatures below -150° C and as low as -273° C.*

b. Who are other manufacturers/your competitors in the market for these sensors?

- Scientific Instruments (USA)
- Adsem (USA)
- Temati (UK)
- Aivon Oy (Finland)
- MicroSensor (Ukraine)

5. While the above exemptions already apply from temperatures at and below – 20 °C, you request the exemption for temperatures below – 150 °C only.

a. Do the above problems, in particular the tin pest, not occur at temperatures between – 20 °C and – 150 °C, or have you found a solution for this temperature range?

*We have not found a robust and reliable solution for this temperature range.*

b. Are there any other reasons for your lower temperature threshold?

*It was our intent to submit an exemption that addressed cryogenic sensor temperatures. Cryogenics generally been used to refer to temperatures below*

*approximately -150 C.“ (The MacMillan Encyclopedia Of Chemistry, New York, 2002: Dr. Ray Radebaugh;NIST Cryogenic Technologies Group)*

- c. Are all your sensors used across the entire temperature range from close to 0 K to at least 290K and higher in each of the products in which they are integrated?

*All of our sensors will experience room temperature during use or storage and are designed to cycle below -150° C. Some are designed to measure temperatures as low as -273° C..*

- d. If not, why would you need an exemption for all your sensors?

*N/A; all of our cryogenic temperature sensors require this exemption.*

**Please note that answers to these questions are to be published as part of the available information relevant for the stakeholder consultation to be carried out as part of the evaluation of this request. If your answers contain confidential information, please provide a version that can be made public along with a confidential version, in which proprietary information is clearly marked.**