

1st Questionnaire (Clarification Questionnaire)

Exemption for „Lead in solders of alpha spectrometers, pulse-processing electronics, scintillation detectors and spectroscopy systems used in equipment to identify radiation”, requested for 7 years

Abbreviations and Definitions

AMETEK	AMETEK–Advanced Measurement Technology
EEE	electrical and electronic equipment
Pb	lead

Background

The Oeko-Institut and Fraunhofer IZM have been appointed within a framework contract¹ for the evaluation of applications for the renewal of exemptions currently listed in Annexes III and IV of the new RoHS Directive 2011/65/EU (RoHS 2) by the European Commission.

AMETEK has submitted a request for a new exemption, which has been subject to a first evaluation. The information AMETEK has referred has been reviewed and as a result we have identified that there is some information missing. Against this background the questions below are intended to clarify some aspects concerning your request.

We ask you to kindly answer the below questions until 11 October 2017 latest.

Questions

1. Please provide a list of manufacturers in and outside the EU
 - a. of alpha spectrometers, pulse-processing electronics, scintillation detectors and spectroscopy systems: **Ametek-Advanced Measurement Technologies, 801 South Illinois Ave. Oak Ridge TN, 37830-9101**
 - b. of manufacturers of equipment that use the above devices to identify radiation: **Ametek-Advanced Measurement Technologies, 801 South Illinois Ave. Oak Ridge TN, 37830-9101**
2. Please specify the types of EEE pertaining to question 1.b which are designed and conceived to identify radiation, and their typical use scenarios: **Spectroscopy Systems,**

¹ The contract is implemented through Framework Contract No. FWC ENV.A.2/FRA/2015/0008 of 27/03/2015, led by Oeko-Institut e.V.

Scintillation Detectors (NaI), Pulse-Processing Electronics, Alpha Spectrometers. These instruments were specifically designed to be used in nuclear research and measurement. Typically, these devices are integrated into systems specifically configured for the end user's application. The application may be in nuclear power plants, a research department of nuclear science and the monitoring of quantities and location of nuclear materials around the world.

3. You indicate the amount of lead used under the exemption with around 0.7 kg per year in the EU.
 - a. Does the above amount of lead represent the use of lead in EEE produced by AMETEK only (i), or the total amount of lead used under the exemption (ii)? **ii**
 - b. In case (i) applies, please provide a substantiated estimate for the total use of lead under the requested exemption in the EU and worldwide.
 - c. In case (ii) applies, please provide a substantiated estimate for the total worldwide use of lead under the requested exemption: **Approximately 4.5 Kg of lead per year worldwide under the requested exemption. This calculation is based on the estimated quantity of lead used per solder connection multiplied by the average number of solder connections per unit sold worldwide of the instruments within this exemption request.**

4. Tin whiskers are a risk that can at least be mitigated if not completely avoided. Lead-free solders are standard meanwhile in other EEE and in vehicles which have long life cycles, are operated in harsh environments, and/or are safety relevant.
 - a. Please explain why the risk of whiskers for your devices is so different that it would justify an exemption in the light of the above said: **The level of reliability required for nuclear systems are inherently higher than that of consumer electronics and even higher than the automotive industry. Long life cycles in our industry stretch far greater than that of consumer or automotive. The consumer market and automotive industry can also easily replace a failed component. Other items in harsh environments and/or are safety relevant are replaceable instead of requiring serviceability enabling them to utilize mitigating methods that force replacement rather than service at a component level. Finally, a failure due to inaccurate nuclear measurements in power plants or nuclear research facilities has an impact to public health. Risk of the possibility of tin whiskers that could lead to the failure to accurately measure or identify nuclear material could be detrimental to the welfare of public health and safety.**
 - b. Please explain your efforts in the past years since 2017 to manage the risk of whiskers, e.g. by design adaptations, annealing, etc., and provide evidence of your efforts: **Over the past ten years Ametek-AMT has replaced non-RoHs components with RoHs versions where the impact did not affect form fit or function or had zero impact to the functionality of the instruments. The assemblies within this exemption request still utilize thru-hole technology when most of the industry has moved over to surface mount technology. This has forced our company to procure life time buys and secure contracts from inventory management companies to ensure we are able**

to procure the materials necessary to manufacture our electronic assemblies and supply the instrumentation that meet our customers specifications and demands. The solder used to secure these components, however has not been replaced due to the impact of heat sensitive components and the high-reliability required for the application. Annealing, conformal coatings and other methods utilized to reduce tin-whisker growth is not viable in these applications. Annealing impacts heat sensitive components and conformal coatings reduce the serviceability. The impact of modifying the instruments past their initial designs to meet RoHs requirements will change the form fit and function from their originally designed purpose and will have a negative impact on the applications our customers use them in. Most of these instruments have been on the market for twenty years some as long as forty-five years. Our customers have been using these same instruments in their application for just as long. To have a major modification to the electrical characteristics of the circuitry by replacing leaded assemblies with new lead-free designs would be detrimental to the function of the instruments and force customers to rebuild entire laboratories and research facilities along with impacting the standardized nuclear material monitoring methods. Ametek-AMT intention is to supply our customers these instruments until all available stock is used up which forces the obsolescence of the products. Ametek-AMT plan for obsolescence of these assemblies is going to be determined by the availability of the components.

- c. Please provide evidence that despite these efforts whiskers occurred in your devices. Because we have continued to utilize a 37% lead solder the instances of tin whiskers growth have been mitigated. We routinely service instruments built in the past thirty years that have not displayed any evidence of tin whisker growth.

5. As part of the evaluation, socio-economic impacts shall also be compiled and evaluated. For this purpose, please provide details in respect of the following:

- a. Volume of electrical and electronic equipment (EEE) concerned, which is placed on the EU market annually by you and all manufacturers of equipment in the scope of your requested exemption; 300-500 units per year.
- b. Please estimate possible impacts on employment in total, in the EU and outside the EU, should the exemption not be granted. Please detail the main sectors for which impacts are expected for you and all manufacturers of equipment in the scope of your requested exemption, i.e. manufacturers, supply chain, retail, etc: The electronic assemblies solder in the EU are integrated into or support systems that make up 25% of Ametek-AMT annual sales. The implications of not having the exemption granted would be detrimental to the U.S. based manufacturing facility and EU based sales and customer service locations. Losing 25% percent of potential business would force layoffs in both the U.S. and European markets due to overseas sales forces and service centers currently housed in the United Kingdom, Germany, Spain, Italy and France.
- c. Please quantify additional costs (money expenditure) through substitution of the restricted substance – or replacement of the EEE by other, RoHS-compliant EEE if feasible – for you and all manufacturers of equipment in the scope of your

requested exemption divided into sectors (private, industry, public) if the exemption request is rejected compared to the situation that it is granted: There are no substitutions or replacements on the market for the instruments in the exemption request. Ametek-AMT instrumentation is not designed for the use in the public section. These are nuclear science and nuclear monitoring instruments specifically designed for use with integrated systems to meet our customers' requirements. The estimated cost of redesigning these instruments with RoHS-compliant versions is upward of eleven million dollars. This includes the research and development cost of the redesign of the electronic assemblies plus the extensive industry acceptance testing for nuclear instrumentation that is required before a product can be introduced into the market. Ametek-AMT Product Management Team is responsible for meeting with our customers to determine if there is a market to invest the resources to re-engineer RoHS-compliant versions of these instruments. If there is a market projected past the seven-year exemption request, Ametek-AMT will strive to replace these instruments with new versions that meet the RoHS directive.

- d. Is there any generation of additional waste to be expected if the exemption is rejected compared to the situation that it is granted? Ametek-AMT currently has life time buys, service parts and assemblies, stock at current distributors and stock at inventory management companies that will have to be dispositioned if the exemption is rejected.

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.