Exemption Request Form ROHS 6b I

02 December 2019

Date of submission: _____

European Aluminium

1. Name and contact details

1) Name and contact details of applicant:

Company:	European Aluminium	Tel.:	+32 2 775 63 58
Name:	Magdalena Garczynska	E-Mail:	garczynska@european-aluminium.eu; (on maternity leave until half of May 2020)
	Cc: Adil Elmassi		elmassi@european-aluminium.eu (replacing Mrs Garczynska from 12.2019-05.2020)
Function:	Recycling Director	Address:	Avenue de Tervueren 168, 1150 Brussels, Belgium

2) Name and contact details of responsible person for this application (if different from above):

Company:	_____	Tel.:	_____
Name:	_____	E-Mail:	_____
Function:	_____	Address:	_____

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2. Reason for application:

Please indicate where relevant:

☐ Request for new exemption in:

☐ Request for amendment of existing exemption in

☒ Request for extension of existing exemption in

☐ Request for deletion of existing exemption in:

☐ Provision of information referring to an existing specific exemption in:

☒ Annex III ☐ Annex IV

No. of exemption in Annex III or IV where applicable: 6 (b) I

Proposed ~~or existing~~ wording:

Lead as an alloying element in aluminium **casting** alloys containing up to **0,3 %** lead by weight, provided recycled lead-bearing aluminium scrap is the only source of the lead

Duration where applicable: 5 years

☐ Other: _____

3. Summary of the exemption request / revocation request

The industry is applying for a narrowed scope of the current exemption for the next 5 years at a reduced lead limit to 0.3%.

3.1 CIRCULAR ECONOMY

Recycling of aluminium scrap is an important part of the circular economy. Aluminium contributes to building the European infrastructure and is one of the major raw materials in industries with high recycling rates such as construction, automotive and packaging, engineering products and more.

In order to contribute to the circular economy and secure the efficient use of raw materials, an appropriate collection infrastructure, including well-functioning shipment legislation, needs to be in place.

3.2 Industry efforts over the last few years

In the EU Standard EN 1706 for Aluminium and aluminium alloys - Castings that should be submitted to the Formal Vote before 19 January 2020 the maximum limit for lead was reduced to 0,29 % (weight by weight). In the attempt to reduce lead content in aluminium, the aluminium industry has been working on a compromise regarding the maximum limit for lead in alloys. The maximum limit for each grade of alloyed aluminium ingot for aluminium casting alloys defined in the standard has been reduced to 0.29%. The compromise was agreed after careful assessment of technical properties that the alloys need to meet and its composition, as well as the availability of aluminium scrap for recycling on the market.

This voluntary agreement is possible because the lead content in Al scrap has slowly decreased over several years and it is estimated to decrease further over time.

3.3 As highlighted in the previous application, aluminium produced from recycled scrap metal may contain lead. The reason for this is that scrap coming from products from the past can sometime contain lead. When these products are recycled the lead will unintentionally and unavoidably be transferred to the new casting alloys.

Mechanical separations in advance to the remelting/refining process such as eddy current and density processed, can hugely reduce the amount of lead as well as of other metals going into the aluminium scrap, or to some extent separate high lead containing Al scrap from the low lead containing scrap. However, high lead containing Al scrap should be recycled and not be landfilled to obtain significant environmental benefits. The last chance to remove lead is at the remelting stage. A study on ‘Existing technologies for lead removal from Aluminium melts’ [1] was carried out by MIMI Tech UG and finalized in June 2012 (the study is attached to this application). The study shows that only few methods could be found and were assessed, i.e. Phase separation, Electrolysis and Vacuum distillation. These methods are either not approved above lab-scale or from an environmental/economical perspective are not feasible. The only

alternative is to dilute the metal with primary aluminium. This would result in higher environmental impacts due to the fact that the production of primary aluminium is energy intensive. We are not aware of any further study since the last renewal from 2018. Since the last renewal was introduced only in 2018, there hasn't been enough time to further plan and implement additional industry studies. To our knowledge, there have not been any publicly funded research programmes for such studies. Therefore, academia has not worked in this domain. European Aluminium has long called for the right infrastructure for collection and sorting in order to increase recycling rates in Europe as well as calling for increased funding for treatment and sorting technologies.

Thus, lead is included in the scrap flow as an impurity which cannot be separated during the scraping process phase. So far science and technology have not found a solution yet. The level of tolerance is specified in both European standards for aluminium scrap and for aluminium alloys.

In particular, aluminium alloys from the EN 43000 to 47000 series made from scrap and the products produced from these alloys may contain lead e.g. the production of frameworks of lamps and lights, heat sinks, electrical and electronic items in housing and industries, etc.

Allowing the use of lead-containing aluminium scrap at reduced level of 0.3% provides the possibility of effective and efficient use of recycled aluminium scrap coming from the European Union without posing any health or environmental risks and will facilitate the natural reduction of lead containing scrap on the market.

Shall the exemption extension not be granted there is a risk of increased amount of scrap going to landfill.

3.4 Therefore, European Aluminium, requests the extension of the existing exemption: 'Lead as an alloying element in aluminium casting alloys containing up to 0,3 % lead by weight, provided recycled lead-bearing aluminium scrap is the only source of the lead, for the duration of 5 years. This request is supported by the members of European Aluminium.

4.Technical description of the exemption request / revocation request

(A) Description of the concerned application:

1. To which EEE is the exemption request/information relevant?

Name of applications or products: several components like frameworks of lamps and lights, heat sinks, electrical and electronic items in housing and industries and more include aluminium alloys with lead. The list is not exclusive.

a. List of relevant categories: (mark more than one where applicable)

☒ 1
☒ 2
☒ 3
☒ 4
☒ 5
☒ 6
☒ 7
☒ 8
☒ 9
☒ 10
☒ 11

b. Please specify if application is in use in other categories to which the exemption request does not refer: _____

c. Please specify for equipment of category 8 and 9:
The requested exemption will be applied in
☐ monitoring and control instruments in industry
☐ in-vitro diagnostics
☐ other medical devices or other monitoring and control instruments than those in industry

2. Which of the six substances is in use in the application/product?
(Indicate more than one where applicable)
☒ Pb ☐ Cd ☐ Hg ☐ Cr-VI ☐ PBB ☐ PBDE

3. Function of the substance: Lead is coming from lead bearing scrap as an impurity when recycled metal is used.
4. Content of substance in homogeneous material (%weight): 0.3%

5. Amount of substance entering the EU market annually through application for which the exemption is requested: no data available for the estimation
Please supply information and calculations to support stated figure.

6. Name of material/component: Aluminium alloy

7. Environmental Assessment: Various LCA prove that health and the environmental impact of recycled aluminium has less effect than the use of primary aluminium .

LCA:

☐ Yes

☒ No a separate LCA is not submitted with this request as these are already published comparing primary and scrap aluminium[1]

(B) In which material and/or component is the RoHS-regulated substance used, for which you request the exemption or its revocation? What is the function of this material or component?

Aluminium alloys (containing lead).

Aluminium recycling is the key contributor to circular economy. The industry relies entirely on the scrap as a raw material. This scrap can contain unwanted impurities like lead. Lead containing aluminium alloys in massive form do not cause environmental and health effects. All risk is well managed by the industry.

Aluminium alloys are widely used in the production of EEE products and parts, such as frameworks of lamps and lights, heat sinks, electrical and electronic items in housing and industries, etc.

(C) What are the particular characteristics and functions of the RoHS-regulated substance that require its use in this material or component?

Lead is present in scrap aluminium and therefore in the recycled aluminium. In some alloys lead was added because of machinability. Not adding additional lead to new alloys will contribute to decrease of lead in the final products that are going back to recycling at the end of their life.

5. Information on Possible preparation for reuse or recycling of waste from EEE and on provisions for appropriate treatment of waste

1) Please indicate if a closed loop system exist for EEE waste of application exists and provide information of its characteristics (method of collection to ensure closed loop, method of treatment, etc.)

We are not aware of specific closed loop EEE material systems. Aluminium scrap coming from the EEE waste are recycled and become an aluminium product again, e. g. an EEE product or an automotive or building product, etc. However we are not aware of specific closed loop recycling ensuring EEE products recycling into EEE products recycling.

[1] https://www.european-aluminium.eu/resource-hub/environmental-profile-report-2018/ (this publication has been independently assessed)

Here below is a general description on the recycling of EEE waste, as indicated in the previous application:

After the de-pollution step carried out according to WEEE Directive, WEEE consists chiefly of a mixture of metal, plastics and glass. From here, the treatment of WEEE in general has the following steps, though the process may vary with different combinations of: shredding, magnetic separation, and eddy current separation (more than once), there is also the possibility of density separation on the separation table and/or hand separation.

The stainless steel, Al and Cu fractions are separated from other ferrous metals and other non-ferrous metals, including lead, during these processes, mainly achieved by eddy current separation and/or density separation, and can be sent directly to the steel works or refineries. The metal content in the plastic can be high; however it is possible to further recover these metals later during the plastic recycling process or, if the plastic is incinerated, from the bottom ash of the incinerators.

The aluminium fraction will be further processed in a secondary refining plant. Before melting, when necessary, scraps may be first pre-treated to remove coating or oil. With the addition of salt, scrap is melted in a suitable furnace, and then refined and casted according to product specification.

2) Please indicate where relevant:

☒ Article is collected and sent without dismantling for recycling

☐ Article is collected and completely refurbished for reuse

☐ Article is collected and dismantled:

- ☐ The following parts are refurbished for use as spare parts: _____
- ☐ The following parts are subsequently recycled: _____

☐ Article cannot be recycled and is therefore:

- ☐ Sent for energy return
- ☐ Landfilled

3) Please provide information concerning the amount (weight) of RoHS substance present in EEE waste accumulates per annum:

☐ In articles which are refurbished _____

☒ In articles which are recycled no volume data available for estimation, however it is estimated that there is less scrap available of the market today that contains lead,

☐ In articles which are sent for energy return _____

☐ In articles which are landfilled _____

6. Analysis of possible alternative substances

(A) Please provide information if possible alternative applications or alternatives for use of RoHS substances in application exist. Please elaborate analysis on a life-cycle basis, including where available information about independent research, peer-review studies development activities undertaken

There is no need for substitution identified at this stage. (Please see point 8 for assessment and justification);

Currently most aluminium scrap contain lead and no commercial process is available to remove it. As a result recycled aluminium casting alloys contains some lead. Therefore, the only way to avoid lead or to comply with more stringent lead limit value is to dilute secondary aluminium with primary metal. This will result in significant increase of environmental impact since primary aluminium production is an electricity intensive process. According to European Aluminium data, the share of recycled aluminium in European end-use applications was 26 percent in 2000. However, by 2050, recycled and primary are expected to have almost equal shares of total European demand.[2]

(B) Please provide information and data to establish reliability of possible substitutes of application and of RoHS materials in application

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7. Proposed actions to develop possible substitutes

(A) Please provide information if actions have been taken to develop further possible alternatives for the application or alternatives for RoHS substances in the application.

The aluminium casting alloys manufacturers have been looking into the technical possibilities to remove lead from the aluminium scrap, which proved to be challenging. However not adding additional lead to new alloys will contribute to decrease of lead in the final products that are going back to recycling at the end of their life.

(B) Please elaborate what stages are necessary for establishment of possible substitute and respective timeframe needed for completion of such stages.

There is no need for substitution, it is a matter of dilution that will come over the time.

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[2] Vision 2050 report EUROPEAN ALUMINIUM'S CONTRIBUTION TO THE EU'S MID-CENTURY LOW-CARBON ROADMAP https://www.european-aluminium.eu/vision-2050/

8. Justification according to Article 5(1)(a):

(A) Links to REACH: (substance + substitute)

1) Do any of the following provisions apply to the application described under (A) and (C)?

☒ Authorisation

- ☒ SVHC
- ☒ Candidate list
- ☐ Proposal inclusion Annex XIV
- ☐ Annex XIV

☐ Restriction

- ☐ Annex XVII
- ☐ Registry of intentions

☒ Registration

2) Provide REACH-relevant information received through the supply chain.
Name of document:

(B) Elimination/substitution:

1. Can the substance named under 4.(A)1 be eliminated?

☐ Yes. Consequences? _____

☒ No. Justification: Elimination is not possible but only dilution over time.

2. Can the substance named under 4.(A)1 be substituted?

☐ Yes.

- ☐ Design changes:
- ☐ Other materials:
- ☐ Other substance:

☐ No.

Justification:

Substitution:

There is no need for substitution, it is a matter of dilution that will come over time.

Elimination:

With new lead-free alloys being implemented, as well as the limits of lead the concentration of lead is going down, it is expected that the volume of leaded aluminium will decrease over time. Different value chain industry segments have different approaches to limit the use of alloys with lead. To our understanding some have the objective to phase out SVHC-substance over time.

Aluminium manufacturers of casting alloys voluntarily agreed to lower the level of lead in alloys down to level 0.3%

Due to this dynamic it is expected that the amount of Pb in scrap will be reduced over time.

As indicated already in the previous application, mechanical separations in advance to the remelting/refining process such as eddy current and density processed, can hugely reduce the amount of lead as well as of other metals going into the aluminium scrap, or to some extend separate high lead containing Al scrap from the low lead containing scrap. Further removal of lead can only be achieved during the melting stages.

OEA conducted a study on 'Existing technologies for lead removal from Aluminium melts'. The study was carried out by MIMI Tech UG and finalized in June 2012. The study reviewed a number of methods to remove lead from the aluminium alloys. These methods are summarised here:

Phase separation: The phase separation of the aluminium-lead alloy is examined by solidification in the molten phase. With the help of nucleating agents, lead droplets rise and freeze below the binodal temperature. The droplets can thus be possibly separate from the molten aluminium.

This procedure is only an academic one due to the small scale of melt treatable and no reproducible results have been achieved in a pilot scale. This method might, if at all, be used for high-cost/ high-purity Aluminium and special applications. But in those cases, the use of primary Aluminium is probably more economical.

Electrochemical refining: Tests were carried out electrochemically in a three-layer cell. With direct addition of alkali salts and controlled addition of sodium significant reductions for lead have been achieved.

This method has existed for more than 20 years with little success beyond testing. The key obstacle is the significant amount of energy needed for the process, which makes the method both environmentally and economically undesirable.

Vacuum distillation: Laboratory and pilot tests show that vacuum treatment can also remove lead from molten aluminium at above 1000°C. However, only at 1300°C and with one hour distillation time, the removal of lead can take place with sufficient speed.

Again apart from the high system cost and difficulties to scale up, the high energy consumption deems the method environmental undesirable.

All three methods are in the stage of laboratory/academic research and small scale testing, the obstacles to the development of these methods are not only economic in terms of system and equipment cost, but also an environmental issue, mostly due to the high amount of energy required. There are very limited options, if any, to overcome the later. Furthermore, such lead-reduced aluminium is expected to be used in special applications. But whichever applications they are, high quality aluminium from primary production is likely to be a ready and less expensive alternative. For the above discussed rationales, there are no clear steps forward.

Evidently, more ground research and tests are needed to enable further conclusions on these methods.

3. Give details on the reliability of substitutes (technical data + information):

   In casting no substitutes are needed as lead is only coming from lead bearing scrap

4. Describe environmental assessment of substance from 4.(A)1 and possible substitutes with regard to
   1) Environmental impacts:
   2) Health impacts: _____
   3) Consumer safety impacts: _____

⇨ Do impacts of substitution outweigh benefits thereof?
Please provide third-party verified assessment on this: _____

In casting no substitutes are needed as lead is only coming from lead bearing scrap

(C) Availability of substitutes:

Describe supply sources for substitutes: Primary aluminium can be used instead of recycled metal for many uses.

a) Have you encountered problems with the availability? Describe:
b) Do you consider the price of the substitute to be a problem for the availability?
   ☐ Yes ☐ No

(D) What conditions need to be fulfilled to ensure the availability? Not relevant

(E) Socio-economic impact of substitution:

Not relevant

⇨ What kind of economic effects do you consider related to substitution?

- ☐ Increase of direct production costs
- ☐ Increase in fixed costs
- ☐ Increase in overhead
- ☐ Possible social impacts within the EU
- ☐☐ Possible social impacts external to the EU
- ☐ Other: _____

⇨ Provide sufficient evidence (third-party verified) to support your statement:

9. Other relevant information

Please provide additional relevant information to further establish the necessity of your request:

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10. Information that should be regarded as proprietary

Please state clearly whether any of the above information should be regarded to as proprietary information. If so, please provide verifiable justification:

References:

[1] “Existing technologies for lead removal from Aluminium melts“, 2012, MIMI Tech UG Preusweg 98, D-52074 Aachen.

[2] Vision 2050 report EUROPEAN ALUMINIUM’S CONTRIBUTION TO THE EU’S MID-CENTURY LOW-CARBON ROADMAP 2018

[3] Environmental Profile Report, Life-Cycle inventory data for aluminium production and transformation processes in Europe 2018, European Aluminium