

Proposal for harmonised environmental classification of lead metal

1. About European Aluminium

European Aluminium, founded in 1981, is the association that represents the whole value chain of the aluminium industry in Europe.

We actively engage with decision-makers and the wider stakeholder community to promote the outstanding properties of aluminium, secure growth and optimise the contribution our metal can make to meeting Europe's sustainability challenges.

Through environmental and technical expertise, economic and statistical analysis, scientific research, education and sharing of best practices, public affairs and communication activities, European Aluminium promotes the use of aluminium as a permanent material that is part of the solution to achieving sustainable goals, while maintaining and improving the image of the industry, of the material and of its applications among their stakeholders.

2. Context

European Aluminium and its members would like to outline the impacts in the European aluminium industry of the proposal for a harmonized environmental classification and labelling of lead metal (CAS Number 231-100-4, EC Number 7439-92-1), submitted by the Danish Environmental Protection Agency on the 16th of February 2017, based on Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP Regulation). According to this proposal, lead will be classified as:

- ❖ Aquatic acute 1; H400: very toxic to aquatic life with an M-factor of 10.
- ❖ Aquatic chronic 1; H410: very toxic to aquatic life with long lasting effects with an M-factor of 10.

3. Implications for the aluminium industry

Alloys are considered to be mixtures for the purposes of CLP Regulation. The classification of mixtures for long-term hazards, based on the summation of the concentrations of classified components, is summarised in Table 4.1.2 of Annex I to CLP Regulation. Applying the formulas set in this table, the classification of lead as aquatic chronic 1 with an M-factor of 10 will trigger the environmental classification of aluminium alloys containing lead as follows:

- ❖ Aluminium alloys containing lead in a concentration $\geq 0.025\%$ shall be classified as aquatic chronic 3.
- ❖ Aluminium alloys containing lead in a concentration $\geq 0.25\%$ shall be classified as aquatic chronic 2.

The classification of aluminium alloys as aquatic chronic 2 would trigger further consequences:

- Aquatic chronic 2 substances and mixtures are covered by Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances (Seveso III Directive):

- Annex I to Seveso III Directive sets out the qualifying quantities of dangerous substances for the application of lower-tier and upper-tier requirements. For the particular case of aquatic chronic 2 substances or mixtures these quantities are 200 and 500 tons, respectively.
- Therefore an establishment where 200 tons of aluminium alloys containing lead in a concentration at or above 0.25% (hence classified as aquatic chronic 2) are present will be in the scope of Seveso III Directive.
- At the end of their lifetime, products made of aluminium alloys containing lead in a concentration at or above 0.25% will become hazardous waste:
 - Council Regulation (EU) No 2017/997 lays down conditions to classify a waste as hazardous by HP 14 “ecotoxic”. According to this Regulation, waste which contains lead in a concentration at or above 0.25% shall be classified as hazardous.
 - Out of the scope of the End of Waste Regulation:
 - Council Regulation (EU) No 333/2011 establishing criteria determining when certain types of scrap metal cease to be waste (End of Waste Regulation) is applicable, among others, to aluminium scrap that does not display any of the hazardous properties listed in Annex III to Directive 2008/98/EC.
 - Therefore, aluminium scrap containing lead at or above 0.25% will be out of the scope of the End of Waste Regulation.

4. Technical aspects

❖ No distinction between massive and powder form

The proposal does not provide for a distinction in the classification of the massive form and the powder form of lead. Both forms are classified with an M-factor of 10.

The proposal presumes that the massive form could lead to particles in the powder range. However, the experience in the aluminium industry shows that the melting process of scrap and the manufacturing of recycled aluminium alloys does not produce particles.

The final product, the aluminium ingot, will not produce particles due to handling.

Therefore it is not probable that massive forms of aluminium alloys containing lead can produce powder-like particles under reasonably expected use.

❖ **Biological availability**

Article 12 of CLP Regulation states that, for the purposes of classification, it shall be taken into account if conclusive scientific experimental data show that the substance or mixture is biologically available.

The solubility of a substance increases with decreasing particle size; however, the proposal does not take into account the different biological availability of the metal form.

Alloys represent a specific case of materials which require more information as they show disparate intrinsic properties compared to their individual metal constituents. A number of metallurgical factors can affect metal release, such as crystal structure, inclusion in a matrix, density... in addition to physical form and shape.

Bio-elution refers to the in vitro extraction methods used to measure the degree to which a substance or metal ion is released into artificial biological fluids.

European Aluminium has performed some in vitro tests in order to measure and evaluate the degree to which lead ion is released from aluminium alloys.

The tests were performed using massive lead as the reference substance and aluminium alloys containing lead in different concentrations.

These tests have demonstrated that the migration of lead ions from aluminium alloys is much lower than the migration of lead ions from massive lead metal. It can be concluded that the migration of lead ions is reduced when the lead is contained in a metallic matrix. Therefore, the biological availability of lead from aluminium alloys is very limited.

5. Current situation of the European aluminium industry

Europe is a world leader in aluminium recycling, providing products to automotive, building, packaging, aerospace and engineering solutions sectors.

Today, more than 90% of recycled aluminium alloys produced in the EU contain lead above 0.025%. Therefore, these alloys will be classified as aquatic chronic 3.

In addition, in some EU regions more than 80% of recycled aluminium alloys contain lead in the range of 0.25% – 0.40%. Therefore, these alloys will be classified as aquatic chronic 2 and will be subject to the provisions explained above.

Lead cannot be economically separated from aluminium alloys or removed during the scrap processing or secondary refining due to the high reactivity of aluminium compared to that of lead.

In order to produce secondary aluminium with a lead content below 0.025%, recyclers would need to dilute the scrap with high purity aluminium or with primary metal. This would increase the cost of production and companies would lose profitability. The cost estimated is 200 – 300 Euro/ton (it can differ depending on the facility).

The aluminium recycling industry is essential for the European economy because allows the recycling of end of life aluminium scrap in order to produce new materials with energy savings up to 95% compared to the production of primary aluminium. The emission of greenhouse gases are reduced in the same amount. Recycling aluminium contributes to the decarbonisation of Europe and to the achievement of resource efficiency goals. This makes the aluminium recycling industry a key contributor for a true circular economy in the EU.

6. Consequences of the proposed classification

The proposed classification will have a severe impact on the recycling businesses operating in Europe.

The main consequences of the proposed classification of lead for the aluminium recycling sector are:

- **Decrease in market demand for recycled aluminium.** The products classified as aquatic chronic will have more difficulties to be absorbed by the market and will suffer from higher and unbearable production costs. This will jeopardise the entire aluminium recycling industry. It would be expected that the European recycled aluminium industry lost orders and, as a consequence, became less competitive.
- **Increase in imports.** It is expected that articles containing parts made on aluminium lead alloys above the listed concentration limits will be imported from outside the EU borders; this is, the manufacturing processes of finished goods will move to areas outside EU and then export the products back to the EU.
- **Dependency on imported primary aluminium.** As stated above, companies would need to dilute aluminium scrap with high purity aluminium or with primary aluminium in order to reduce the concentration of lead in their products. As European smelters are already running at full capacity, this will lead to need of import aluminium from non-EU regions.
- **Increase in export of scrap.** It is foreseeable that the aluminium scrap containing lead at or above 0.025% will be exported outside Europe's borders. This will hinder the aluminium sector's efforts to increase scrap availability and limit scrap leakage.
- **Increase in landfilling in the EU.** The additional costs implied to scrap treatment can lead to landfilling. This would generate a loss of an essential resource as an "energy bank" for the sector and for Europe as a whole and will not bring any net benefit to the EU environment.

- **Companies granted environmental permits for end of waste criteria cannot process hazardous waste.** The change of classification from non-hazardous to hazardous waste will impact the current environmental permits of the plants treating aluminium scrap according to the end of waste criteria. It would not be possible to apply the end of waste criteria, which is widely applied in the Italian market, and consequently it will be necessary to apply for an authorization for the recycling of hazardous waste.
- **Increase of costs.** The proposed classification will increase the costs for the industry:
 - Higher operational costs. Higher transport cost, specific storage area and more complex shipment permit.
 - Higher administrative costs. Applying for an authorization to treat hazardous waste is usually more complex and expensive than the procedure to treat non-hazardous waste.
 - Higher costs for labelling and packaging. The final product will need to be labelled and packaged according to the new classification.

It can be concluded that the proposed classification:

- will have a serious impact on the recycling businesses operating in the EU and therefore in the circular economy roadmap
- will not bring any net benefit to the environment
- will hamper other EU key goals, especially in the fields of: resource efficiency, recycling targets, financial and administrative burden on Small and Medium Enterprises (SMEs), competitiveness and employment.

7. Provisions on lead in other EU directives

The following EU directives set limits for the concentration of lead in aluminium alloys:

- ❖ **Directive 2000/53/EC on end of life vehicles.**
 - Objective. This Directive lays down measures which aim, as a first priority, at the prevention of waste from vehicles and, in addition, at the reuse, recycling and other forms of recovery of end-of life vehicles and their components so as to reduce the disposal of waste, as well as at the **improvement in the environmental performance** of all of the economic operators involved in the life cycle of vehicles and especially the operators directly involved in the treatment of end-of life vehicles.
 - Exemption 2(c): Aluminium with a lead content up to 0.4% by weight.
- ❖ **Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive).**
 - Objective. This Directive lays down rules on the restriction of the use of hazardous substances in electrical and electronic equipment (EEE) with a view to **contributing to the protection of human**

health and the environment, including the environmentally sound recovery and disposal of waste EEE.

- Exemption 6(b): Lead as an alloying element in aluminium containing up to 0.4% lead by weight.

The common purpose of these EU directives (end of life vehicles and RoHS) is to ensure a high level of protection of human health and the environment. These directives set limits for the concentration of lead in aluminium alloys containing lead. As seen, this limits exceed the value of 0.025% which will trigger the aquatic chronic 2 classification of aluminium alloys containing lead.

8. Further provisions on lead

❖ Directive 94/62/EC on packaging and packaging waste.

- Objective. This Directive aims to harmonize national measures concerning the management of packaging and packaging waste in order, on the one hand, **to prevent any impact thereof on the environment** of all Member States as well as of third countries or to reduce such impact, thus **providing a high level of environmental protection**, and, on the other hand, to ensure the functioning of the internal market and to avoid obstacles to trade and distortion and restriction of competition within the Community.
- The sum of concentration levels of lead, cadmium, mercury and hexavalent chromium shall not exceed 0.01%.
- This provision is applied in aluminium “can to can” recycling. It is possible to keep such low level of lead due to the scrap coming from one source: cans which are re-melted into cans again. This cannot be achieved in case of other scrap sources as they contain more than 0.025%.

❖ CEN harmonized standards:

- EN 601:2004 (Chemical composition of castings for use in contact with foodstuff)
- EN 602:2004 (Chemical composition of semi-finished products used for the fabrication of articles for use in contact with foodstuff)
- Lead content in aluminium alloys used for food contact materials: 0.05%

9. Conclusions

The European aluminium industry has demonstrated its strong and voluntary commitment to delivering best in class performance in terms of environmental sustainability and protection of human health and safety.

The aluminium recycling industry is an important industry in Europe, which contributes to the decarbonisation of Europe and to the achievement of resource efficiency goals.

The proposal for a harmonised environmental classification of lead metal would lead to a further loss of competitiveness of the European aluminium industry in a context already characterized by an uneven global playing field, shortage of raw materials, increasing dependency from third-countries imports, plant closures and job loss.

For these reasons, European Aluminium and its members call for a careful consideration of the proposal for harmonised classification and labelling of lead in the massive form as aquatic acute 1 and aquatic chronic 1.

European Aluminium remains at ECHA's disposal to further assess the implications of such a measure on the aluminium recycling industry.