

## Table of Contents

### Contents

ILA comments – final – 270422.pdf.....	2
Annex 1: Attachments .....	18
Attachment 1a: 1a. recom_com_call_for_info_2022 - common template_030322_Pb.pdf.....	19
Attachment 1b: 1b. recom_com_call_for_info_2022 - common template_130422_Pb.pdf.....	35
Attachment 2: ILA paper: First Uses of Lead Metal in the EU, ILA, 2021 .....	53
Annex 2: ILA member companies.....	57
Annex 3: Pb REACH Consortium member companies.....	58

## ILA comments – final – 270422.pdf

---

**We consider the “Call for Information (on behalf of the Commission) on the possible socio-economic consequences of the authorisation requirement” to be aimed primarily at downstream users of lead metal – stakeholders who we have encouraged to respond directly.**

**At the launch of the consultation, the International Lead Association (ILA), as Secretariat to the Pb REACH Consortium, prepared template answers to key cross-cutting questions posed by the Commission’s 32-question [Word-based questionnaire](#), including on overall EU volume, uses of lead metal, total volumes per use, and general risk management measures in the workplace and in respect of environmental emissions. It was intended that the template answers would assist member companies and downstream users, sector associations, and national non-ferrous metals federations when preparing their own responses to the Call for Information.**

**However, we also consider it important to submit a joint ILA and Pb REACH Consortium response to the Commission Call for Information, in order to provide some context to the market data included in the template answers, to submit information on risks and their management, and to state why alternatives to REACH Authorisation Listing are more appropriate. In making this submission, we also provide the Commission with copies of Industry-owned reports and publicly available data sources, papers, etc, referenced in the template answers and in this document.**

## Introduction

The purpose of this paper is to provide information on the template answers (e.g. Attachments 1a and 1b) which ILA shared with relevant stakeholders, particularly to clarify the amended data on EU production capacity (Qu. 19), overall uses (Qu. 2), total use volumes (Qus. 3, 15), risks and their management (Qus. 6-8), and to elaborate why REACH Authorisation is not an appropriate risk management option for lead metal (e.g. Qus. 31-32). The paper also presents key messages which supplement our position statement (Attachment 4).

The document also includes the following annexes:

- Annex 1 lists the files submitted additionally within the ZIP folder, mainly the Industry-owned information sources referenced in the template answers, and additional references
- Annex 2 lists the ILA member companies represented in this response
- Annex 3 lists the Pb REACH Consortium member companies represented in this response.

---

## KEY MESSAGES

**The organisations represented in this response to the Commission Call for Information do not support the inclusion of lead metal in REACH Annex XIV. It would be disproportionate and an inefficient risk management measure, and a survey which ILA undertook of downstream uses of lead**

**metal has highlighted that Authorisation listing will likely result in over 1,200<sup>1</sup> Applications for Authorisation** for the ECHA Secretariat, Member State representatives, and the Commission to process. This number far exceeds the number of AfA submitted for any substance already listed in REACH Annex XIV.

The existing “lead-specific” legislative framework, which includes the EU binding limit values for all occupational settings, is **collectively the best regulatory management tool for management of risks associated with the use of lead and lead compounds**. However, if the Commission were to identify a specific risk which needs to be addressed beyond the measures already in place, use of specific measures such as targeted REACH Restrictions would be more effective and proportionate than inclusion of lead metal in REACH Annex XIV. In the case of unacceptable risk from the service life of articles, targeted restrictions – properly enforced – would ensure both cohesion of the internal market and competitiveness with non-EU actors.

The Commission should postpone any decision to include lead metal in Annex XIV until it has fully assessed the **impact of the review of the EU binding limit values for lead and lead compounds**.

The Commission should also take into consideration the **impact of other relevant legislative provisions** which, while **still in progress at the time of this Call for Information**, are expected to be implemented before a decision on REACH Authorisation Listing of lead metal would be taken – including the proposed REACH Restriction on lead in ammunition and fishing tackle, the proposed Batteries Regulation, the review of relevant End-of-Life Vehicle (ELV) and Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directives and their exemptions, as well as the review of the Industrial Emissions Directive.

Additionally, **while the REACH Revision is under implementation**, the Commission should **postpone the inclusion of additional substances in REACH Annex XIV**.

ILA and the Lead REACH Consortium have also published a position paper: [Position-paper-Pb-metal-Authorisation-final web Jun22.pdf \(ila-reach.org\)](#), which summarises our key asks.

---

## **OVERALL EU VOLUMES MANUFACTURED**

***With reference to Qu. 3 in the Commission Call for Information;***

According to data from the International Lead and Zinc Study Group, ILZSG, in 2020 – a typical year for lead production and use – approximately 1.65 million tonnes of lead metal was manufactured in the EU, 73% (approximately 1.2 million tonnes) coming from recycling of end-of-life products; in the same year, approximately 1.62 million tonnes of lead metal was used in the EU<sup>2</sup>.

***With reference to Qu. 19 in the Commission Call for Information;***

---

<sup>1</sup> “Analysis of responses received in ILA AfA survey of downstream users”, referenced in Annex 1 as Attachment 6 (submitted confidentially)

<sup>2</sup> Data for 2020 not published but submitted by ILZSG in 2021 into a Eurometaux-commissioned study regarding metals and inorganic resources necessary for the Green Deal; the resulting *Metals and Clean Energy* report by KU Leuven was launched on 25 April 2022

Within the EU, lead metal manufacturers/recyclers are based in 17 Member States: Austria, Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, Sweden.

Estimated EU27 refinery capacities for lead<sup>3</sup>:

<b>Country</b>	<b>Estimated capacity (tonnes)</b>
Austria	30 000
Belgium	185 000
Bulgaria	130 000
Czech Republic	45 000
Estonia	12 000
France	70 000 <sup>(3)</sup>
Germany	580 000
Greece	69 000
Hungary	14 000
Italy	260 000
Poland	190 000
Portugal	15 000
Romania	75 000
Slovakia	12 000
Slovenia	35 000
Spain	212 000
Sweden	85 000
<i>Total</i>	<i>2 019 000 <sup>(3)</sup></i>

*NB The estimated capacity for France was updated in April 2022 in the template answers (Attachments 1a, 1b) provided by ILA to member companies and downstream users, based on updated local data provided to ILA, as reported in the table above.*

## **USES OF LEAD METAL**

<sup>3</sup> “World Directory: Primary and Secondary Lead Plants”, ILZSG, 2020 (NB 2021 version now available)

***With reference to Qu. 2 in the Commission Call for Information;***

Use of lead metal in the production of lead-based automotive and industrial batteries is the main application: today, **EU battery production accounts for approximately 86-90%<sup>4</sup> of the use by volume.**

Other **smaller-volume uses of lead metal include** (in no particular order):

- Use as an alloying element in free-machining brasses, bronzes, steel, and aluminium alloys, including in the automotive sector under ELV Annex II exemptions and in sectors regulated by the RoHS Directive (2011/65/EU)
- Use in solder, e.g., in the case of electrical and electronic equipment as permitted under exemption in the RoHS Directive
- Use in the production of inert lead anodes, articles which are used in for electrowinning and electrogalvanising processes, and in every chrome plating facility
- Use in sheathing of electric cables, e.g. for high-voltage export cables connecting renewable energy farms to the electricity grid
- Use as a chemical reagent in scientific research and development, including in fire assay for precious metals analysis
- Use in the production of radiation shielding, e.g. for medical, dental, veterinary, and non-destructive testing facilities, in nuclear medicine and in security applications
- Use of molten lead in closed systems, as a heat transfer agent e.g. in the nuclear industry
- Use as an industrial lubricant, e.g. in aerospace applications
- Lining of tanks/vessels/pipework in the chemical industry, e.g. for phosphoric acids, bromides
- Use as a chemical intermediate to make lead compounds, including in the battery production process
- Use in the production of architectural lead sheet, e.g. for weatherproofing, soundproofing and in earthquake protection
- Use in the production of ballast
- Use in the production of various cast and extruded articles such as weights and counterweights
- Use in the production of lead wool, primarily used as caulking to seal joints between lead and steel fittings in industrial settings, and also in specialist gas sensors
- Use in other galvanising processes such as hot-dip galvanising
- For steel wire patenting
- Use in the production of ammunition for hunting and sports shooting
- Lead also acts as (extraction) medium in recycling and precious metal metallurgical processes.

Professional uses of lead are limited to specific uses of lead in solder, e.g. for reparative uses in plumbing.

There are **NO** consumer uses of lead metal as a substance or in a mixture – these are restricted under Entry 30 of Annex XVII. There are also restrictions on the use of lead in certain consumer articles, e.g. jewellery, and articles which can be mouthed by children (Entry 63).

---

<sup>4</sup> “First Uses of Lead Metal in the EU”, ILA (2021) – i.e. Attachment 2; NB the estimated tonnages for cable sheathing and rolled and extruded products were amended April 2022 based on clarified market data provided by those DU sectors; the updated tonnages supersede those quoted in Attachment 2 and the original template answers in Attachment 1a.

A REACH Restriction on the use of lead in gunshot in or around wetlands was adopted in January 2021 and a restriction on lead in gunshot in other terrains and in other ammunition, and in fishing tackle, is already under consideration by the ECHA Committees.

### OVERALL EU USE VOLUMES

*With reference to Qu. 15 in the Commission Call for Information;*

- (a) Overall annual commodity demand in the EU: **1621.6 kt** (in 2020, which was a typical usage year)<sup>2</sup>
- (b) Overall Pb metal volume manufactured annually in the EU: **1650.482 kt** (in 2020), of which 445.5 kt primary and 1204.937 kt secondary<sup>2</sup>
- (c) Overall annually imported into the EU: **94.2 kt** (in 2020)<sup>2</sup>
- (d) Overall exported annually from the EU: **76.7 kt** (in 2020)<sup>2</sup>

*With reference to Qu. 3 in the Commission Call for Information;*

As noted above, 86-90%<sup>4</sup> of the total volume of lead metal used every year in the EU is used to make lead-based batteries, exclusively in industrial settings. Batteries are sealed articles with no potential for consumer exposure during their service life; the lead battery value chain also operates in a closed loop in the EU with nearly all lead batteries being collected and recycled by highly regulated facilities at end-of-life.

The following table gives the volumes for ‘first uses’ of Pb metal in the EU in 2015 as quoted in a consultant’s report<sup>5</sup> prepared for the International Lead Zinc Study Group (ILZSG) in 2017, alongside estimates made by the International Lead Association for 2021<sup>4</sup>.

*NB the estimated tonnages for ‘rolled and extruded products’ (i.e. mainly lead sheet) and ‘cable sheathing’ were amended in April 2022 based on clarified market data provided to ILA by organisations within those downstream sectors. As such, the approximate percentages were also amended since the original template answers (Attachment 1a) which ILA prepared for stakeholders.*

Use	Tonnes (ILZSG, data for 2015 <sup>5</sup> )	Tonnes (ILA 2021 estimate <sup>4</sup> )	Approx. percentage for 2021
<b>Automotive batteries</b>	809,000	809,000*	86*
<b>Industrial batteries</b>	460,000	460,000*	
<b>Rolled and extruded products</b>	95,000	80,000 <sup>4</sup>	5
<b>Shot and ammunition</b>	57,000	57,000	4
<b>Cable sheathing</b>	18,000	50,000 <sup>4</sup>	3-4

<sup>5</sup> “Main first uses of lead and zinc in Europe”, report by Oakdene Hollins report for the International Lead Zinc Study Group, 2017

<b>Lead compound manufacture (intermediate use)</b>	68,000	20,000**	1-2
<b>Miscellaneous (including alloys and solders)</b>	10,000	5,000	<1

*\*The Association of European Automotive and Industrial Battery Manufacturers (EUROBAT) reports the share of lead metal used in EU lead-battery production as 90% (approximately 1.5 million tonnes) of the total EU lead usage, therefore the tonnages estimated by ILA based on 2015 ILZSG data are assumed to under-represent today's market share.*

*\*\*There was a rapid decline in use of lead compounds since 2015, due to the substitution of lead-based stabiliser in PVC to lead-free alternatives, an application which was previously a significant market for a number of lead compounds. Under the VinylPlus commitment (<https://www.vinylplus.eu/our-achievements/our-progress/>), sales by ESPA members of lead-based stabilisers in the EU-28 market ceased in December 2015.*

## **ENVIRONMENT AND HEALTH**

### ***With regard to Qu. 6 in the Commission Call for Information;***

The health hazards of lead metal are well established, and an EU-wide harmonised classification exists through an entry in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 (CLP) and additional self-classification by the REACH registrants.

The classification, and the inclusion of lead metal on the REACH Candidate List, triggers requirements for specific labelling (where packaged) and, through REACH Article 31, the provision of Safety Data Sheets to provide downstream users (including workers) with information on hazards and risk management measures. Article 33 also sets out requirements to disclose the presence of SVHCs, including lead metal, above 0.1% w/w to recipients of articles.

Lead metal is manufactured and recycled under stringent conditions in highly-regulated industrial facilities. Moreover, in the lead manufacturing (and battery production and recycling) sector, Industry best practice now far exceeds the requirements of the EU's lead-specific legislation which was implemented to address risk.

### ***Risks for workers involved in lead metal manufacturing***

There is potential for workplace exposure to lead during primary and secondary production of lead metal, from smelting and refining lead-containing ores, from the workplace use of lead metal, and from recycling of end-of-life lead-based batteries, scrap, industrial residues, and e-waste.

According to a report commissioned by DG EMPL<sup>6</sup> to support revisions to existing EU binding occupational exposure limits for lead and compounds, it is estimated that in the lead metal manufacturing sector there are 6,500 workers potentially exposed to lead metal (2,500 in the manufacturing of lead from ores and concentrates, and 4,000 in the recycling of lead batteries at end-of-life).

### Risks for the general public

There is the potential for general population exposure via the environment, in the context of emissions from sites engaged in lead metal manufacturing. However, all EU non-ferrous metals manufacturing and industrial use sites are regulated by the Industrial Emissions Directive 2010/75/EU (IED), the main EU instrument regulating pollutant emissions from industrial installations. The IED aims to achieve a high level of protection of human health and the environment taken as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT).

Under the IED, EU industrial plants are required to operate in strict accordance with permits granted by the authorities in the relevant Member State. For lead and lead battery plants, the permits contain conditions, set in accordance with the principles and provisions of the IED, which includes lead emission limit values based on the BAT. The effectiveness of the implemented risk management measures is regularly checked through monitoring of stack emissions and any effluent discharges, industrial installations having to report environmental data to the Competent Authority on a regular basis.

Risks to the general population from lead exposure via the environment are also addressed by legislation dealing with lead levels in ambient air, water, drinking water, waste, and food. Key EU legislation dealing with ambient air, water, drinking water, waste, and food is listed in Annex I to our position paper (Attachment 4).

### ***With regard to Qu. 7 in the Commission Call for Information;***

#### Worker exposure management

Strict risk management processes are observed when working with lead, and there is a long-standing framework of legislation developed to specifically address the occupational risk of working with lead. This framework covers the manufacture of lead metal, the industrial use e.g. to produce articles, professional use, and recycling at end-of-life to recover lead and other materials.

This existing legislation provides binding and enforceable minimum requirements for the control of risks from industrial manufacturing and use of lead. In having a binding occupational exposure and biological limit for lead, supported by additional measures such as medical surveillance, Council Directive 98/24/EC (Chemical Agents Directive, CAD) has ensured that harmonised, EU-wide standards operate – and Member States can establish more (but not less) stringent requirements.

Lead metal and its compounds was the only group of substances under the Chemical Agents Directive to have a binding Occupational Exposure Limit (OEL) in Annex I to CAD, and lead and its ionic compounds were the only substances for which a binding biological limit value and specific health surveillance measures are set out (Annex II to CAD). The binding workplace exposure limits for lead and compounds are now regulated under Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens, mutagens or reprotoxic substances at work; as such the requirement for

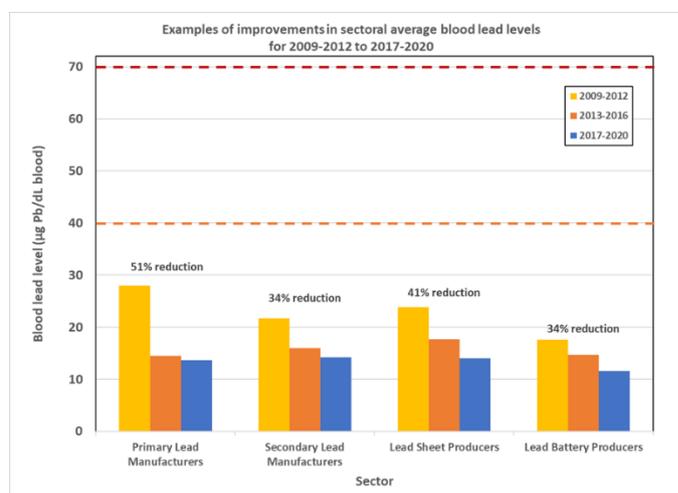
---

<sup>6</sup> Commission study report “Study on collecting information on substances with the view to analyse health, socio-economic and environmental impacts in connection with possible amendments of Directive 98/24/EC (Chemical Agents) and Directive 2009/148/EC (Asbestos) Final report for lead and its compounds” (Aug 2021)

substitution of lead through the hierarchy of controls is strengthened. The EU’s binding occupational exposure limits are also currently being revised to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing lead or using it in processes in scope of REACH Authorisation. All EU Member States have existing National occupational and biological limits designed to protect workers exposed to lead and compounds. In most Member States these will be revised downwards as a result of the anticipated revision to the EU binding occupational and biological limit values, offering further protection to EU workers.

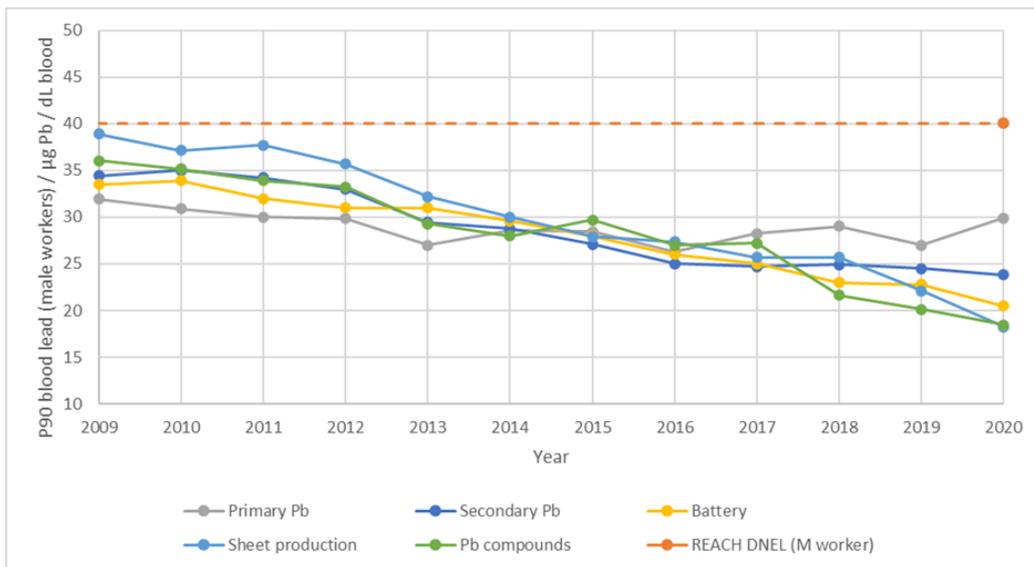
In addition to regulatory standards, the lead manufacturing industry has established proactive, voluntary targets for reducing employee exposure, such as the long-standing voluntary exposure management programme administered by the International Lead Association (ILA). The current blood lead target, established in 2017, is for no employee to have a blood lead level exceeding 20 µg Pb/dL blood. This target value is less than one-third of the existing EU binding biological limit value of 70 µg Pb/dL blood specified in the Chemical Agents Directive (now transposed to Directive 2004/37/EC). The ILA Voluntary Blood Lead Reduction Programme has resulted in significant reductions in lead exposures in employees working in lead metal manufacturing facilities. At the beginning of the ILA programme in 2013, nearly 2000 workers – i.e. 25% of all workers across ILA member companies – had a blood lead value exceeding 20 µg Pb/dL blood. By the end of 2020, less than 10% of workers in ILA member companies had blood lead levels exceeding the Industry voluntary target of 20 µg Pb/dL blood<sup>7</sup>. This reduction is a significant achievement, but the organisations represented by this response are committed to continue adopting best practice and continuous improvement in the management of occupational lead exposures.

Figures 1 and 2 below demonstrate trends in employee blood lead levels for lead manufacturing and key use sectors, as recorded via the Lead REACH Consortium’s blood lead surveys for REACH Registration.



**Figure 1** Improvement in average sectoral blood lead levels from 2009-2012 to 2017-2020 for lead manufacturing (primary, secondary), lead sheet production, and lead battery production; orange-dashed line denotes REACH DNEL for male workers; red-dashed line denotes current EU binding biological limit value

<sup>7</sup> <https://ila-lead.org/ila-member-companies-continue-to-deliver-reductions-in-employee-lead-exposures/> (last checked 27 April 2022)



**Figure 2** Reduction in worker blood lead levels (90th percentile) from 2009 to 2020 for the following sectors: primary Pb metal manufacturing, secondary Pb metal manufacturing, manufacture of Pb compounds, Pb battery production, Pb sheet production. Orange-dashed line denotes REACH DNEL for male workers.

Via safety data sheets, employers in lead manufacturing and use sectors are informed on the importance of workers' good personal hygiene, blood lead monitoring, and use of personal protective equipment. On personal hygiene, the SDS instructs employers to:

- ensure workers follow simple hygiene rules
- ensure workers do not wipe away sweat with hands or arms
- ensure workers use disposable tissues rather than a handkerchief
- prohibit drinking, eating and smoking in production areas, and prohibit access to eating and non-production areas in working clothes
- ensure workers wash hands, arms, faces and mouths (but preferably shower) and change into clean clothing before entering eating areas
- for high exposure workplaces, separate rooms for cleaning hands, removal of clothes, showers and clean clothes may be necessary
- ensure workers handle dirty working clothes with care
- allow no personal belongings to be taken into production areas, or items that have been used in production areas to be taken home
- ensure general shop cleanliness is maintained by frequent washing/vacuuming
- clean every workplace at the end of every shift.

Regarding blood lead monitoring; all workers potentially exposed to lead substances are enrolled in comprehensive medical surveillance scheme, including routine blood lead measurements, covering all site activities and requiring more frequent blood lead monitoring for workers undertaking high-risk jobs and those with elevated blood lead levels.

### Environmental emissions management

In general, a number of measures may be taken by facilities to reduce Pb emissions to water:

- Chemical precipitation (used primarily to remove the metal ions)
- Sedimentation
- Filtration: used as final clarification step
- Electrolysis: for low metal concentration
- Reverse osmosis: extensively used for the removal of dissolved metals
- Ion exchange: final cleaning step in the removal of heavy metal from process wastewater

-and in the case of reducing emissions to air, again in general a number of measures may be taken:

- (Wet) Electrostatic precipitators using wide electrode spacing
- Cyclones, but as primary collector Fabric or bag filters, which have high efficiency in controlling fine particulates
- Ceramic and metal mesh filters (PM10 particles are removed)
- Wet scrubbers.

Lead removal from waste-water treatment works should be at least the minimum default 84% removal currently used in the REACH Chemical Safety Report. Solid material collected from on-site treatment must be sent for metal recovery or treated as hazardous waste. Waste-water treatment sludge is normally recycled in the smelter. It is not used as agricultural fertiliser.

The Non Ferrous Metals Best Available Techniques Reference Document (NFM BREF)<sup>8</sup> sets out applied processes and techniques to prevent emissions to air, diffuse air emissions, emissions to water, and the prevention of emissions to soil and groundwater. Chapter 2 describes general processes and techniques, and Chapter 5 is specific to processes used to manufacture lead metal (and tin):

- Section 5.1.1 describes the applied processes and techniques used for primary Pb metal production,
- Section 5.1.3 describes the same for secondary Pb metal production,
- Section 5.1.4 describes the same for lead refining,
- Section 5.1.5 describes the same for melting and alloying processes for lead, and
- Section 5.3 describes in more detail the techniques to prevent or, where this is not practicable, to reduce the environmental impact of installations in the sector that were considered in determining the BAT.

This information includes, where relevant, the environmental performance levels (e.g. emission and consumption levels) which can be achieved by using the techniques, the associated monitoring and the costs and the cross-media issues associated with the techniques.

General measures include applied processes and techniques for raw material handling (including battery breaking, and crushing, size reduction and screening), for reducing sulphur dioxide emissions, for water and waste-water management, and for residue management. For example, Section 2.4.3 of the NFM BREF describes how dust, fumes and gases from metal production processes can be collected and conveyed to abatement or treatment processes, and also lists other reported measures to prevent diffuse emissions and collect off-gases from metal production.

---

<sup>8</sup> Author(s); Gianluca Cusano, Miguel Rodrigo Gonzalo, Frank Farrell, Rainer Remus, Serge Roudier, Luis Delgado Sancho; Title: Best Available Techniques (BAT) Reference Document for the main Non-Ferrous Metals Industries, EUR 28648 EN, doi: 10.2760/8224

The effectiveness of measures to prevent lead emissions in the lead battery production and recycling sectors has recently been demonstrated in a study recently published<sup>9</sup> in the Journal of Exposure Science & Environmental Epidemiology. Using emission data obtained from facilities producing and recycling lead batteries across the EU, the study concluded that emissions from lead battery production and recycling – i.e. the largest-volume use sector, representing 86-90%<sup>4</sup> of the annual lead usage in the EU – have a minimal impact on general population blood lead levels at regional level: "*The predicted contribution of Pb in human blood arising from emissions from lead battery manufacturing and recycling for the regional scale was 0.15 µg Pb/L for children (1-3 years) and 0.06 µg Pb/l for adults. This value is about 1% of total Pb blood levels, according to available recent monitoring data for children <7 years across Europe*".

***With regard to Qu. 8 in the Commission Call for Information;***

*Worker exposure*

The most appropriate and effective way, on an EU-wide basis, to address worker exposure is to strengthen and implement revised occupational and biological exposure limits. The biological limit value (and the OEL) applies not just to workers using lead metal but also to those who might be incidentally exposed to lead in the course of their work, e.g., in demolition, in shipbuilding, repair and breaking, in the scrap industry, in installation and maintenance of lead-containing articles, and more. Therefore, from a regulatory effectiveness perspective the ongoing review of the existing EU binding biological and occupational limit values is key to reducing worker exposure on an EU-wide basis in all workplaces where employees may be exposed to lead in the course of their professional activities and will cover a much wider population that would be in scope of REACH Authorisation.

Additionally, as noted above, the organisations represented in this response are committed to best practice and continuous improvement. Most EU companies that manufacture lead metal, including those who recycle lead-based batteries, or produce lead batteries, are enrolled in long-standing voluntary exposure management programmes such as that administered by the International Lead Association (ILA) and EUROBAT (the European Association for Automotive and Industrial Battery Manufacturers). Enrolment in these Workplace Blood Lead Reduction Programmes is a condition of membership.

*Environmental emissions and consequent man-via-environment exposure*

Recent E-PRTR<sup>10</sup> data indicates that across the EU-27 there was an 88% reduction in emissions of lead to air and an 80% reduction in lead emissions to water between 2007-2020. E-PRTR data highlights that the majority of lead emissions in the EU now result from activities which are **NOT** in scope of REACH Authorisation for lead metal.

A recent study<sup>11</sup>, which used E-PRTR data, facility data collected from lead battery producers and recyclers, and other information sources, concluded that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are all regulated by the IED. The same study<sup>11</sup> also confirmed that use of lead-containing ammunition is the major source of lead emission to water (87%) and soil (98+%) – as articles, the use of lead-containing

---

<sup>9</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5> (last checked 22 April 2022)

<sup>10</sup> <https://industry.eea.europa.eu/analyse/pollutant> (last checked 27 April 2022)

<sup>11</sup> Pb EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published) – i.e. Attachment 3 (submitted confidentially)

ammunition could not be subject to REACH Authorisation and in any case a REACH Restriction has already been proposed.

Strengthening the IED and the E-PRTR Regulation, and delivering the ongoing REACH Restriction proposal on lead in ammunition and fishing tackle, will be a more effective and proportionate method of reducing lead emissions to air, water and soil than REACH Authorisation Listing of lead metal.

### **LIKELY EFFECTS ON RECYCLING OR SUSTAINABILITY**

*With regard to Qu. 26 in the Commission Call for Information;*

**Lead plays an essential role in the European circular economy of other metals.** The carrier metal properties of lead make it an efficient and effective enabler of high-tech recycling in the EU. The EU's non-ferrous metals recyclers can recover over 20 metals from post-consumer and industrial waste streams, including scrap, catalytic converters, e-waste, and other increasingly complex products at end-of-life<sup>12</sup>. In this way, lead is a key enabler in maintaining the value of materials and resources for as long as possible by returning them into the product cycle at end-of-life, helping to minimise waste.

As shown by the 'metal wheel' in the UNEP (2013) report<sup>13</sup>, the lead value chain is inextricably linked to the production of other valuable and critical raw materials – metals such as zinc, copper, tin, bismuth, indium, gold, silver, and platinum group metals – many of which contribute to future breakthrough technologies for a more sustainable economy. As the EU's ETN Socrates project has highlighted<sup>14</sup>, lead has a fundamental role of lead in the circular economy and in urban mining, enabling the recovery and recycling of other critical metals and materials from electronics waste and other complex products: *“lead metallurgy is fundamental if the EU wants to retain its leading position in the global circular economy”*.

A healthy circular economy for the EU is built upon the foundation of an advanced metallurgical infrastructure, of which lead metallurgy is a critical component. According to researchers<sup>15</sup>, lead should be seen alongside zinc, copper, nickel and tin as the “Big Five” at the heart of the non-ferrous metals industry. These five metals are the carrier metals in both primary production and recycling for many of the critical and valuable metals needed for today's sustainable technologies.

The closed loop economy of the EU lead and lead battery value chains provides the raw materials needed locally to make new products, thereby limiting the potential for environmental exposure by keeping lead in the value chain and out of Europe's waste stream, indefinitely. Every year, for example, more than 100 million used lead batteries are kept out of the EU's waste stream by a value chain embracing circular economy principles and operating in a fully closed loop<sup>16</sup>. The established EU infrastructure for collecting and recycling lead batteries effectively makes lead the only battery raw material for which the EU is geographically autonomous and does not rely heavily in imports of virgin minerals and metals. Given the anticipated massive increase in energy storage demand required to service the EU's climate change ambitions, it makes no sense to use REACH authorisation to remove such a critical battery raw material

---

<sup>12</sup> <https://leadmatters.org/circular-economy/> / <https://www.unicore.com/en/about/recycling/> (last checked 20 April 2022)

<sup>13</sup> <https://wedocs.unep.org/handle/20.500.11822/8423> (last checked 21 April 2022)

<sup>14</sup> <https://etn-socrates.eu/socrates-press-release-on-the-importance-of-lead-metallurgy/>

<sup>15</sup> Reuter, Markus, Matusiewicz, Robert, Schaik, Antoinette. (2015). PLENARY LECTURE: Lead, Zinc and their Minor Elements: Enablers of a Circular Economy. World of Metallurgy - ERZMETALL. 68. 132-146

<sup>16</sup> <https://chargethefuture.org/#:~:text=on%20Europe's%20roads.-,SUSTAINABLE> (last checked 27 April 2022)

during this time, especially considering that many other battery chemistries are based upon use of metals that have also have CMR properties (e.g., Nickel, Cobalt, Lithium, Cadmium etc).

The EU has some of the world's most advanced and efficient non-ferrous metals production sites – many of which are lead battery recyclers – creating value, skills and 'green' jobs. With a quarter of the world's recycled metals already generated in Europe<sup>17</sup>, lead metallurgy can ensure Europe's continued global leadership role in the circular economy: the loss of lead metallurgy due to REACH Authorisation Listing would remove a central process for Europe's multi-metallic recycling industry, making it less efficient and less competitive.

### **Regulatory options**

#### ***With regard to Qu. 31 of the Commission Call for Information;***

The organisations represented by this response consider that other regulatory options could better address the concerns for human health or the environment for which the substance is recommended for inclusion in Annex XIV.

The EU already has a very comprehensive framework of lead-specific legislation designed to manage risks presented by lead exposure. Importantly, key aspects of the EU's regulatory framework designed to minimise and reduce lead exposures are already being reviewed to ensure an even higher level of protection of human health and the environment. In particular, the EU's binding occupational exposure limits are currently being revised by DG Employment to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing and using lead, and the IED is being reviewed – the IED regulates pollutant emissions, including lead, from all relevant industrial installations, not just lead manufacturing and use.

In the context of general population exposure to lead via the environment, it would be more effective to strengthen legislative controls on industrial activities which contribute most to the air and water emissions. As noted above, according to recent E-PRTR data<sup>10</sup>, across the EU-27 there was an 88% reduction in lead emissions to air and an 80% reduction in lead emissions to water between 2007-2020. According to Industry's further analysis of the data<sup>11</sup>, the majority of remaining lead emissions in the EU now result from activities which are NOT in scope of REACH Authorisation for lead metal, i.e. thermal power stations, pig iron & steel production, and waste management.

Should the Commission still feel it appropriate to include lead metal in REACH Annex XIV, then we believe that its industrial use in specific applications, particularly the production of lead-based batteries and the uses exempted under the ELV and RoHS Directives, meets **ALL** requirements of REACH Article 58(2): the existing Community legislation already addresses the use categories to be exempted, the exemptions are time-limited and subject to periodic review by the Commission, the exempted uses are already under pressure for substitution that is at least equivalent to that which could be achieved by REACH Authorisation. Subjecting these uses additionally to REACH Authorisation would be a clear example of double regulation.

### **OTHER REMARKS**

#### ***With regard to Qu. 32 of the Commission Call for Information;***

---

<sup>17</sup> <https://www.eurometaux.eu/media/2005/full-report-8-56-17.pdf>

The organisation represented in this response consider that inclusion of lead metal in REACH Annex XIV would impede the efficient delivery of EU policy objectives for a strategically autonomous, sustainable and carbon-neutral future.

Inclusion in REACH Annex XIV is not a proportionate nor effective measure given the extensive regulatory framework already in place and for the additional reasons discussed below:

*Proportionality and effectiveness*

***Subjecting lead metal to REACH Authorisation will not reduce exposure or emissions significantly or in a proportionate way. Moreover, we doubt whether REACH Authorisation Listing would lead to a faster phase-out of lead than foreseen in existing regulations.***

Using the REACH Authorisation process to regulate lead metal is not a proportionate regulatory action considering 86-90% of the EU volume is used industrially to produce lead-based batteries. Existing legislation already drives substitution and in particular provides time-limited exemptions in the case of automotive batteries. Moreover, under the proposed EU Battery Regulation it is already foreseen that if there is an unacceptable risk to human health or the environment arising from use of a substance in the production of batteries or during subsequent life cycle stages, the Commission shall adopt a restriction. Therefore, it is clear that existing and proposed EU legislation already addresses risks, and where appropriate drives substitution, associated with battery production that uses the majority of lead placed on the EU market.

As noted above, a recent study<sup>11</sup> concluded that – despite the sector using 86-90% of the total EU use volume per year – the lead battery value chain contributes just 2.2% of the total Pb emissions to air and 0.02% total Pb emissions to water. The same study also compared anthropogenic emissions with emissions via natural processes, concluding that:

- emissions to water via natural processes are 8 times higher than the total from anthropogenic sources (16,140 vs 2,007 tonnes per year),
- emissions to soil via natural processes are 1.7 times higher than the total from anthropogenic sources once ammunition (which is undergoing a REACH Restriction at the time of writing (February 2022) is excluded (723 vs 434 tonnes per year)
- strengthening the IED and the E-PRTR Regulation, and delivering the ongoing REACH Restriction proposal on lead in ammunition and fishing tackle, will be more effective at reducing lead emissions to air, water and soil than REACH Authorisation Listing of lead metal.

Another recent study<sup>18</sup>, which considered recent and historical data on lead isotopic composition in airborne particles in London, showed strong evidence that Pb sources have not changed substantially since the ban in 1999 of leaded gasoline, suggesting that historical gasoline-derived lead remains an important source of lead in today's urban environment due to its persistence and effective remobilisation. The paper suggests that atmospheric lead has now reached a baseline that would be difficult to decrease further, even with additional policy measures (such as REACH Authorisation) targeting ongoing use of Pb substances.

Subjecting almost every use of lead to REACH Authorisation in order to address any limited and specific concerns would be disproportionate and would not result in substantive reductions in emissions or exposure

---

<sup>18</sup> Strong evidence for the continued contribution of lead deposited during the 20th century to the atmospheric environment in London of today, Eléonore Resongles, Volker Dietze, David C. Green, Roy M. Harrison, Raquel Ochoa-Gonzalez, Anja H. Tremper, Dominik J. Weiss. *Proceedings of the National Academy of Sciences* Jun 2021, 118 (26) e2102791118; DOI: 10.1073/pnas.2102791118 (last checked 21 April 2022)

– considering especially that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are not in scope of REACH Authorisation of lead metal.

Including lead metal in REACH Annex XIV would also not encourage substitution more quickly, as the ELV and RoHS Directives, for example, already require substitution where there is a technically feasible alternative – the ELV exemptions scheme and its review process, for example, do not take into consideration socio-economic feasibility of any potential alternatives, only technical feasibility. Therefore the existing lead-specific exemptions review/renewal processes would be more likely to enforce substitution earlier than REACH Authorisation, if a technically feasible alternative were to become available.

### Workload considerations

#### ***Subjecting lead metal to REACH Authorisation will result in many hundreds – if not thousands – of Applications for Authorisation***

During H1 2022, ILA carried out a survey of downstream users of lead metal. 273 responses were received by ILA from organisations representing a total of more than 27,000 legal entities, including 25 responses from EU associations representing in total more than 16,600 entities, and 219 responses from EU companies representing more than 4,850 entities in total<sup>1</sup>.

Respondents were asked to indicate the number of uses per legal entity that would require Authorisation, and the number of entities represented by the response. One downstream sector organisation alone, representing approximately 400 EU entities, anticipates “200 or more” AfA for just one of the uses in their sector, with additional applications necessary for the other uses and from upstream suppliers to the sector.

Of the 273 responses received, 92 responses indicated that the 4,490-plus legal entities represented would apply for Authorisation. To estimate a total reasonable worst-case number of AfA, a number of assumptions were made by ILA, as noted in the analysis (Attachment 6, submitted confidentially). Considering that not all entities represented in the survey responses would end up in applying for Authorisation, and analyses of activities may reveal some applications which would also not be in scope of Authorisation (e.g. uses of articles, intermediate uses, etc), a reasonable estimate of the number of AfA might be based on 50% of the entities represented applying for Authorisation, and half the number of uses initially considered relevant. In which case the survey responses received by ILA suggest **there could be between 1,200 and 8,000 AfA submitted for Pb metal.**

Including lead metal in REACH Annex XIV will add significant burden on regulators. The ECHA Secretariat, its committees comprising Member State representatives, and the Commission and its REACH Committee should expect to be required to assess thousands of Applications for Authorisation, including from lead battery producers, producers of clean energy enabling technologies, producers and users of leaded steels, lead-containing brasses and bronzes, and lead-containing aluminium alloys, and producers of electronic and electrical goods – the majority of whom being applying to continue uses that are already exempted from the restrictions on lead under, e.g., the ELV and RoHS Directives.

### Competitiveness

#### ***Subjecting lead metal to REACH Authorisation will damage cohesion of the internal market and competitiveness with non-EU actors***

REACH Authorisation does not apply to the import or use of articles. The inclusion of lead in Annex XIV would place a requirement – a regulatory burden and additional cost – on EU producers of articles who use lead metal, cost and burden which would not apply to non-EU article producers. EU article producers using lead would become less competitive than their non-EU equivalents, and the balance of EU exports and imports of articles made with lead could shift substantially if the import of articles into the EU were in essence encouraged because of REACH Authorisation requirements for EU lead usage.

Inclusion in REACH Annex XIV would signal to businesses and investors that the EU intends to phase out lead, which could trigger premature and significant market changes and make the EU overall less competitive than non-EU counterparts.

### Demand and disposal

#### ***Subjecting lead metal to REACH Authorisation will negatively impact the EU economy***

Some minor uses of Pb metal, e.g. intermediate uses, uses of articles, would be out of scope of the Authorisation requirement. However, if Pb metal were to be included in Annex XIV *without exemptions or Authorisation being granted*, the EU demand for lead metal would be decreased substantially.

A significant reduction in demand would mean that the recycling of lead batteries and other lead-containing materials at end-of-life would be less commercially viable – and that the recovered lead would no longer have significant value from use in the EU. As noted above, more than 100 million used lead batteries are kept out of the EU's waste stream every year by a value chain embracing circular economy principles and operating in a fully closed loop<sup>16</sup>. But without EU demand for lead, the 1.2+ million tonnes<sup>2</sup> of lead being recycled every year in the EU would instead need to be discarded, somehow, as hazardous waste, or even exported to non-EU countries for their own battery production – it would no longer be kept in the EU value chain which is already an activity that minimises waste and exposure and emissions.

This significant reduction in lead demand would also impact the EU economy: currently, approximately €2 billion worth of lead from recycled sources is used per year for EU lead battery production.

## Annex 1: Attachments

1. Template answers drafted by ILA to support member companies (similar versions were provided to downstream users) when preparing their own submissions to the Commission Call for Information
  - a. First version dated 03 March 2022 (see below)
  - b. Updated version dated 13 April 2022 (see below)
2. ILA paper: *First Uses of Lead Metal in the EU*, ILA, 2021 (see below)
3. Study report: *Pb Emission Inventory for the Environment*, ARCHE Consulting Liefkensstraat 35D B-9032 Wondelgem, Belgium, October 2021, prepared on behalf of the Pb REACH Consortium – *submitted confidentially and therefore not included here*
4. Joint ILA-Pb REACH Consortium position statement (also available at [https://ila-reach.org/wp-content/uploads/2022/02/Position-paper-Pb-metal-Authorisation-final\\_web.pdf](https://ila-reach.org/wp-content/uploads/2022/02/Position-paper-Pb-metal-Authorisation-final_web.pdf) ; last checked 29 Nov 2023)
5. Study report: *Economic Contribution of the European Lead Battery Industry*, prepared by EBP for Association of European Automotive and Industrial Battery Manufacturers (EUROBAT) and International Lead Association (ILA), February 2022 (also available at [https://ila-lead.org/wp-content/uploads/2023/11/EIS-report\\_FINAL\\_01\\_10\\_22.pdf](https://ila-lead.org/wp-content/uploads/2023/11/EIS-report_FINAL_01_10_22.pdf) ; last checked 29 Nov 2023)
6. Report: *Analysis of responses received in ILA AfA survey of downstream users*, ILA, April 2022 – *submitted confidentially and therefore not included here*

### Other referenced data sources:

- For the peer-reviewed publication referred to in footnotes as De Brouwere, K., Verdonck, F., Geerts, L. et al., *Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study*, in *J Expo Sci Environ Epidemiol* (2021), please see: [Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study | Journal of Exposure Science & Environmental Epidemiology \(nature.com\)](#); ; last checked 29 Nov 2023)
- *Main first uses of lead and zinc in Europe*, report by Oakdene Hollins report for the International Lead Zinc Study Group, 2017, [https://www.ilzsg.org/pages/931/document.aspx?page=15&ff\\_aa\\_document\\_type=B&from=3](https://www.ilzsg.org/pages/931/document.aspx?page=15&ff_aa_document_type=B&from=3) (last checked 20 April 2022)
- *World Directory: Primary and Secondary Lead Plants*, International Lead Zinc Study Group report on smelter and refinery capacity, 2020 (2021 version now available), [https://www.ilzsg.org/pages/document/p1/list.aspx?ff\\_aa\\_document\\_type=B&from=8](https://www.ilzsg.org/pages/document/p1/list.aspx?ff_aa_document_type=B&from=8) (last checked 20 April 2022)
- Publication: Reuter, Markus, Matuszewicz, Robert, Schaik, Antoinette. (2015). PLENARY LECTURE: Lead, Zinc and their Minor Elements: Enablers of a Circular Economy. *World of Metallurgy - ERZMETALL*. 68. 132-146, [https://www.researchgate.net/publication/277711917\\_PLENARY\\_LECTURE\\_Lead\\_Zinc\\_and\\_their\\_Minor\\_Elements\\_Enablers\\_of\\_a\\_Circular\\_Economy](https://www.researchgate.net/publication/277711917_PLENARY_LECTURE_Lead_Zinc_and_their_Minor_Elements_Enablers_of_a_Circular_Economy) ; last checked 29 Nov 2023

## Attachment 1a: 1a. recom\_com\_call\_for\_info\_2022 - common template\_030322\_Pb.pdf

Template answers drafted by ILA to support member companies (similar versions were provided to downstream users) when preparing their own submissions to the Commission Call for Information;

- a. First version dated 03 March 2022

### PRIORITISATION

#### PUBLIC CONSULTATION ON SOCIO-ECONOMIC IMPACTS

The objective of this consultation is to inform policy makers about the economic and social consequences of the authorisation requirement. You are invited to provide specific information about the use of the substance and available alternatives, impacts on the environment, public health and society, and impacts on the supply chain and competitiveness.

This questionnaire contains 32 questions and is aimed at individuals, organisations, companies, as well as Member States. Due to the variation of the questions, it is possible that you are not able to answer to all of them.

Thank you for your contribution!

+++

#### Key messages:

The existing legislation framework, which includes the EU binding limit values for all occupational settings, is collectively the best regulatory management tool for lead and lead compounds. However, if the Commission were to identify a specific risk which needs to be addressed beyond the measures already in place, use of specific, targeted measures such as restrictions would be more effective and proportionate than inclusion in REACH Annex XIV.

The Commission should postpone any decision to include lead metal in Annex XIV until it has fully assessed the impact of the review of the EU binding limit values for lead and lead compounds.

The Commission should also take into consideration the impact of other relevant legislative provisions which, while still in progress at the time of this Call for Information, are expected to be implemented before a decision on REACH Authorisation Listing would be taken – including the proposed REACH Restriction on lead in ammunition and fishing tackle, the proposed Batteries Directive, the review of relevant End-of-Life Vehicle (ELV) and Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directives' exemptions, as well as the review of the Industrial Emissions Directive.

Additionally, while the targeted REACH Revision is under implementation, the Commission should postpone the inclusion of additional substances in REACH Annex XIV.

ILA and the Lead REACH Consortium have published a position paper: [Position-paper-Pb-metal-Authorisation-final\\_web\\_Jun22.pdf \(ila-reach.org\)](#).

**SUBSTANCE**

1. What is the name of the substance on which you comment. Please specify if your replies concern more than one substance, e.g. a group of substances with similar uses:

Lead metal (EC 231-100-4)

**USES**

2. What is the use of the substance (sectors, types of uses, categories of products, etc.)?
  - a. In general?

Use of lead metal in the production of lead-based automotive and industrial batteries is the main application: today, EU battery production accounts for approximately 90% of the use by volume<sup>19</sup>.

Other smaller-volume uses of lead metal include (in no particular order):

- Use as an alloying element in free-machining brasses, bronzes, steel, and aluminium alloys, including in the automotive sector under ELV Annex II exemptions and in sectors regulated by the RoHS Directive (2011/65/EU)
- Use in solder, e.g., in the case of electrical and electronic equipment, as permitted under the RoHS Directive
- Use in the production of inert lead anodes, which are used in for electrowinning and electrogalvanising processes, and in every chrome plating facility
- Use in other galvanising processes such as hot-dip galvanising
- For steel wire patenting
- Use as a chemical reagent in fire assay for precious metals analysis
- Use of molten lead in closed systems, as a heat transfer agent e.g. in the nuclear sector
- Use in cable sheathing, e.g. for high-voltage cables connecting renewable energy farms to the electricity grid
- Use in the production of radiation shielding, e.g. for medical, dental, veterinary, and non-destructive testing facilities, in nuclear medicine and in security applications
- Use as an industrial lubricant, e.g. in aerospace applications
- Lining of tanks/vessels/pipework in the chemical industry, e.g. for phosphoric acids, bromides
- Use as a chemical intermediate to make lead compounds, including in the battery production process
- Use in the production of architectural lead sheet, e.g. for weatherproofing, soundproofing and in earthquake protection
- Use in the production of ballast
- Use in the production of various cast and extruded articles such as weights and counterweights
- Use in the production of lead wool, primarily used as caulking to seal joints between lead and steel fittings and also in specialist gas sensors
- Use in the production of ammunition for hunting.

Professional uses of lead are limited to specific uses of lead in solder, e.g. for reparative uses in plumbing.

There are no consumer uses of lead metal as a substance or in a mixture – these are restricted under Entry 30 of Annex XVII. There are also restrictions on the use of lead in certain consumer articles, e.g. jewellery, and articles which can be mouthed by children (Entry 63). A REACH Restriction on the use of lead in gunshot in or around wetlands was adopted in January 2021 and a restriction on lead in other terrains and ammunition, and in fishing tackle, is already planned by the Commission and currently under consideration by the ECHA Committees.

- b. By your company? (*only for companies*)

---

<sup>19</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

*Companies to state for which uses they supply Pb metal in the EU, highlighting ones that are particularly important for your company e.g. in terms of income/business strategy/competitiveness.*

3. Can you specify the use in terms of volume/value?  
a. Overall in the EU?

The EU produces approx. 1.65 million tonnes of Pb metal every year, of which 73% (approximately 1.2 million tonnes) comes from secondary sources<sup>20</sup>.

Approximately 90%<sup>21</sup> of the total volume of lead metal used every year in the EU is used to make lead-based batteries, exclusively in industrial settings. Batteries are sealed articles with no potential for consumer exposure and lead batteries operate in a closed loop in the EU with nearly all being collected and recycled by highly regulated facilities at end-of-life.

The table below gives the volumes for ‘first uses’ of Pb metal in the EU in 2015 as quoted in a consultant’s report<sup>22</sup> prepared for the International Lead Zinc Study Group (ILZSG) in 2017, alongside estimates (tonnages and percentages) made by the International Lead Association for 2021:

Use	Tonnes (ILZSG, data for 2015)	Tonnes (ILA 2021 estimate <sup>23</sup> )	Approx. percentage (ILA 2021 estimate)
<b>Automotive batteries</b>	809,000	809,000	56.9
<b>Industrial batteries</b>	460,000	460,000	32.4
<b>Rolled and extruded products</b>	95,000	50,000*	3.5
<b>Shot and ammunition</b>	57,000	57,000	4.0
<b>Cable sheathing</b>	18,000	20,000	1.4
<b>Lead compound manufacture</b>	68,000	20,000**	1.4
<b>Miscellaneous (including alloys and solders)</b>	10,000	5,000	0.4

*\*there has been a rapid decline in the main application of lead sheet for use in buildings due to market substitution.*

*\*\*there has been a rapid decline in use of lead compounds due to substitution under the VinylPlus commitment and in anticipation of restrictions on lead-based stabilisers in PVC, which was previously a significant market.*

Non-ferrous metals prices discovered on the London Metals Exchange (LME) platforms are used as the global reference price<sup>24</sup>.

- b. By your company? (only for companies)

*Provide (approximate) volume data for your company and the uses into which you supply Pb metal.*

4. What are the properties/functions of the substance on those uses/sectors?

*(Optional for Pb metal manufacturers – provide brief info if available to you, or otherwise leave this question blank)*

<sup>20</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>21</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

<sup>22</sup> “Main first uses of lead and zinc in Europe”, report by Oakdene Hollins report for the International Lead Zinc Study Group, 2017

<sup>23</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

<sup>24</sup> <https://www.lme.com/Metals/Non-ferrous/LME-Lead#Trading+day+summary>

5. Is the substance present in a finished article? If yes, at what concentration?

*(Optional for Pb metal manufacturers – provide brief info if available to you, or otherwise leave this question blank)*

#### **ENVIRONMENT AND HEALTH**

6. Does the use of the substance imply any releases/exposure/risks for workers, consumers or environment?

The health hazards of lead metal are well established, and an EU-wide harmonised classification exists through an entry in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 (CLP) and additional self-classification by the REACH registrants.

Its classification, and the inclusion of lead metal on the REACH Candidate List, triggers requirements for specific labelling (where packaged) and, through REACH Article 31, the provision of Safety Data Sheets to provide downstream users (including workers) with information on hazards and risk management measures. Article 33 also sets out requirements to disclose the presence of SVHCs, including lead metal, above 0.1% w/w to recipients of articles.

Lead metal is manufactured and recycled under stringent conditions in highly-regulated industrial facilities. Moreover, in the lead manufacturing (and battery production and recycling) sector, Industry best practice now far exceeds the requirements of the EU's lead-specific legislation which was implemented to address risk.

#### *Risks for workers involved in lead metal manufacturing*

There is potential for workplace exposure to lead during primary and secondary production of lead metal, from smelting and refining lead-containing ores and from recycling of end-of-life lead-based batteries, scrap, industrial residues, and e-waste.

According to a report commissioned by DG EMPL<sup>25</sup> to support revisions to existing EU binding occupational exposure limits for lead and compounds, is estimated that in the lead metal manufacturing sector there are 6,500 workers potentially exposed to lead metal (2,500 in the manufacturing of lead from ores and concentrates, and 4,000 in the recycling of lead batteries at end-of-life).

#### *Risks for the general public*

There is the potential for general population exposure via the environment, in the context of emissions from sites engaged in lead metal manufacturing. However, all EU non-ferrous metals manufacturing and industrial use sites are regulated by the Industrial Emissions Directive 2010/75/EU (IED), the main EU instrument regulating pollutant emissions from industrial installations. The IED aims to achieve a high level of protection of human health and the environment taken as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT).

Under the IED, EU lead manufacturing plants are required to operate in strict accordance with permits granted by the authorities in the relevant Member State. The permits contain conditions, set in accordance with the principles and provisions of the IED, which includes lead emission limit values based on the BAT. The effectiveness of the implemented risk management measures is regularly checked through monitoring of stack emissions and any effluent discharges, industrial installations having to report environmental data to the Competent Authority on a regular basis.

---

<sup>25</sup> Commission study report “Study on collecting information on substances with the view to analyse health, socio-economic and environmental impacts in connection with possible amendments of Directive 98/24/EC (Chemical Agents) and Directive 2009/148/EC (Asbestos) Final report for lead and its compounds” (Aug 2021)

Risks to the general population from lead exposure via the environment are also addressed by legislation dealing with lead levels in ambient air, water, drinking water, waste, and food. Key EU legislation dealing with ambient air, water, drinking water, waste, and food is listed in Annex I.

7. What measures have been put in place to prevent these releases/exposure/risks?

Worker exposure management

Strict risk management processes are observed when working with lead, and there is a long-standing framework of legislation developed to specifically address the occupational risk of working with lead. This framework covers the manufacture of lead metal, the industrial use e.g. to produce articles, professional use, and recycling at end-of-life to recover lead and other materials.

This existing legislation provides binding and enforceable minimum requirements for the control of risks from industrial manufacturing and use of lead. In having a binding occupational exposure and biological limit for lead, supported by additional measures such as medical surveillance, Council Directive 98/24/EC (Chemical Agents Directive, CAD) ensures that harmonised, EU-wide standards operate – and Member States can establish more (but not less) stringent requirements.

Lead metal and its compounds is the only group of substances under the Chemical Agents Directive to have a binding Occupational Exposure Limit (OEL) in Annex I to CAD, and lead and its ionic compounds are the only substances for which a binding biological limit value and specific health surveillance measures are set out (Annex II to CAD). The EU's binding occupational exposure limits are currently being revised to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing lead or using it in processes in scope of REACH Authorisation. All EU Member States have existing National occupational and biological limits to designed to protect workers exposed to lead and compounds. In most Member States these will be revised downwards as a result of the anticipated revision to the EU binding occupational and biological limit values, offering further protection to EU workers.

In addition to regulatory standards, the lead manufacturing industry has established proactive, voluntary targets for reducing employee exposure, such as the long-standing voluntary exposure management programme administered by the International Lead Association (ILA). The ILA programme has resulted in significant reductions in lead exposures in employees working in lead manufacturing facilities<sup>26</sup>.

***Companies to add company-specific information on their own blood lead reduction performance.***

This reduction is a significant achievement, but our company is committed to continue reducing employee lead exposures to levels as low as reasonably practicable.

Via safety data sheets, employers in lead manufacturing and use sectors are informed on the importance of workers' good personal hygiene, blood lead monitoring, and use of personal protective equipment. On personal hygiene, the SDS instructs employers to:

- ensure workers follow simple hygiene rules
- ensure workers do not wipe away sweat with hands or arms
- ensure workers use disposable tissues rather than a handkerchief
- prohibit drinking, eating and smoking in production areas, and prohibit access to eating and non-production areas in working clothes
- ensure workers wash hands, arms, faces and mouths (but preferably shower) and change into clean clothing before entering eating areas
- for high exposure workplaces, separate rooms for cleaning hands, removal of clothes, showers and clean clothes may be necessary

---

<sup>26</sup> <https://ila-lead.org/ila-member-companies-continue-to-deliver-reductions-in-employee-lead-exposures/>

- ensure workers handle dirty working clothes with care
- allow no personal belongings to be taken into production areas, or items that have been used in production areas to be taken home
- ensure general shop cleanliness is maintained by frequent washing/vacuuming
- clean every workplace at the end of every shift.

Regarding blood lead monitoring; all workers potentially exposed to lead substances are enrolled in comprehensive medical surveillance scheme, including routine blood lead measurements, covering all site activities and requiring more frequent blood lead monitoring for workers undertaking high-risk jobs and those with elevated blood lead levels.

*Companies to add company-specific information on how they address/manage worker exposure, or otherwise edit the text above to make it company-specific.*

#### Environmental emissions management

In general, a number of measures may be taken to reduce Pb emissions to water:

- Chemical precipitation (used primarily to remove the metal ions)
- Sedimentation
- Filtration: used as final clarification step
- Electrolysis: for low metal concentration
- Reverse osmosis: extensively used for the removal of dissolved metals
- Ion exchange: final cleaning step in the removal of heavy metal from process wastewater

-and in the case of reducing emissions to air, again in general a number of measures may be taken:

- (Wet) Electrostatic precipitators using wide electrode spacing
- Cyclones, but as primary collector Fabric or bag filters, which have high efficiency in controlling fine particulates
- Ceramic and metal mesh filters (PM10 particles are removed)
- Wet scrubbers.

Lead removal from waste water treatment works should be at least the minimum default 84% removal used in the REACH Chemical Safety Report. Solid material collected from on-site treatment must be sent for metal recovery or treated as hazardous waste. Waste water treatment sludge is normally recycled, but may be incinerated or landfilled. It is not used as agricultural fertiliser.

*Companies are encouraged to make the paragraph immediately above specific to their site(s) rather than just using this generic text, which is taken from the Pb REACH Consortium's SDS template.*

The Non Ferrous Metals Best Available Techniques Reference Document (NFM BREF)<sup>27</sup> sets out applied processes and techniques to prevent emissions to air, diffuse air emissions, emissions to water, and the prevention of emissions to soil and groundwater. Chapter 2 describes general processes and techniques, and Chapter 5 is specific to processes used to manufacture lead metal (and tin):

- Section 5.1.1 describes the applied processes and techniques used for primary Pb metal production,
- Section 5.1.3 describes the same for secondary Pb metal production,
- Section 5.1.4 describes the same for lead refining,
- Section 5.1.5 describes the same for melting and alloying processes for lead, and

---

<sup>27</sup> Author(s); Gianluca Cusano, Miguel Rodrigo Gonzalo, Frank Farrell, Rainer Remus, Serge Roudier, Luis Delgado Sancho; Title: Best Available Techniques (BAT) Reference Document for the main Non-Ferrous Metals Industries, EUR 28648 EN, doi: 10.2760/8224

- Section 5.3 describes in more detail the techniques to prevent or, where this is not practicable, to reduce the environmental impact of installations in the sector that were considered in determining the BAT.

This information includes, where relevant, the environmental performance levels (e.g. emission and consumption levels) which can be achieved by using the techniques, the associated monitoring and the costs and the cross-media issues associated with the techniques.

General measures include applied processes and techniques for raw material handling (including battery breaking, and crushing, size reduction and screening), for reducing sulphur dioxide emissions, for water and waste water management, and for residue management. For example, Section 2.4.3 describes how dust, fumes and gases from metal production processes can be collected and conveyed to abatement or treatment processes, and also lists other reported measures to prevent diffuse emissions and collect off-gases from metal production.

*Companies to add company-specific information on how they address/manage ENV emissions, or otherwise edit the text above to make it company-specific.*

The effectiveness of measures to prevent lead emissions in the lead battery production and recycling sectors has recently been demonstrated in a study recently published<sup>28</sup> in the Journal of Exposure Science & Environmental Epidemiology. Using emission data obtained from facilities producing and recycling lead batteries across the EU, the study concluded that emissions from lead battery production and recycling – i.e. the largest-volume use sector, representing 90% of the annual lead usage in the EU – have a minimal impact on general population blood lead levels at regional level: *"The predicted contribution of Pb in human blood arising from emissions from lead battery manufacturing and recycling for the regional scale was 0.15 µg Pb/L for children (1–3 years) and 0.06 µg Pb/l for adults. This value is about 1% of total Pb blood levels, according to available recent monitoring data for children <7 years across Europe"*.

8. How can exposure of workers or consumers be further reduced? How can releases into the environment be further minimised?

#### Worker exposure

The most appropriate and effective way, on an EU-wide basis, to address worker exposure is to strengthen and implement revised workplace exposure limits. The biological limit value should be the primary tool for the protection of workers from occupational lead exposures. The biological limit value (and the OEL) applies not just to workers directly exposed to lead, such as those in lead manufacturing plants and sites using lead metal or lead compounds, but also those who might be incidentally exposed to lead in the course of their work, e.g., in demolition, in shipbuilding, repair and breaking, in the scrap industry, in installation and maintenance of lead-containing articles, and more.

From a regulatory perspective, the review of the existing EU binding biological limit value is key to reducing worker exposure on an EU-wide basis in all workplaces in the EU where employees may be exposed to lead in the course of their professional activities.

Additionally, as noted above the lead manufacturing industry is committed to best practice and continuous improvement. Company incentives and initiatives are key to achieving a reduction in blood lead levels in lead-manufacturing facilities in the EU and beyond.

#### Environmental emissions and consequent man-via-environment exposure

---

<sup>28</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

While the current IED provisions and the related NFM BREF process have been a major step forward for the reduction and elimination of pollutants, we welcome the review of the IED and the E-PRTR Regulation.

Recent E-PRTR<sup>29</sup> data indicates that across the EU-27 there was an 88% reduction in emissions of lead to air and an 80% reduction in lead emissions to water between 2007-2020. However the same data also confirms that there are still significant emissions of lead to water and air – and moreover that the majority of lead emissions in the EU now result from activities which are NOT in scope of REACH Authorisation for lead metal.

A recent study<sup>30</sup>, which used E-PRTR data, data from lead battery producers and recyclers, and other information sources, concluded that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are all regulated by the IED. Strengthening the IED and its provisions should therefore affect a reduction in lead emissions from these Top-3 emitters of lead to air.

The same study<sup>31</sup> also confirmed that use of lead-containing ammunition is the major source of lead emission to water (84+%) and soil (98+%) – as articles, the use of lead-containing ammunition could not be subject to REACH Authorisation and in any case a REACH Restriction has already been proposed.

9. Are you aware of any relevant information (e.g. study or article) quantifying the cost of environmental or human health impacts related to the use of the substance?

*(Pb metal manufacturers are recommended to leave this question blank)*

#### AVAILABILITY OF ALTERNATIVES

10. Are you aware about any alternative substances, processes or technologies currently available for the use(s) of the substance?
  - a. If yes, what are these alternatives and where are they used?
  - b. What are the main differences between using these alternatives compared to the substance in question (e.g. whether the alternative substance provides the function and, if so, whether there is any difference in the level of performance; in case of an alternative process or technology, the function may be redundant)?
  - c. What are the hazard properties of the alternatives compared to the substance in question?
  - d. Are the alternatives already available, i.e. drop-in alternatives? Or do their implementation require changes in the production process and investments?
  - e. What is the expected price of alternatives, per unit (e.g. per kilo, tonne)?
  - f. Would an alternative require the same, more or less volume (e.g. in kilos, tonnes) compared to the substance in question?

*(Pb metal manufacturers are recommended to leave this question blank)*

11. Would the use of these alternative substances, processes or technologies have a positive or negative impact, or no effect, on sustainability (considering the whole life cycle: manufacture of the substance/production/consumption/waste/recycling)?

*(Optional for Pb metal producers – provide brief info if available to you, or otherwise leave this question blank)*

12. Are you planning to substitute the substance? If so, by when? *(only for companies)*

---

<sup>29</sup> <https://industry.eea.europa.eu/analyse/pollutant>

<sup>30</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

<sup>31</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

*It is not possible for lead manufacturers to answer this question, nor is it relevant, as substitution is driven by the users and the technical and economic feasibility of potential alternatives.*

13. Are there uses for which there are no alternatives (substances, processes or technologies)? If yes, could you explain why?

*(Pb metal manufacturers are recommended to leave this question blank)*

14. If there are no alternatives, are you aware of any research, development and innovation efforts attempting to develop them? If so, how long do you expect that the development / testing can take?
- In the EU or in non-EU countries?
  - By your company? (*only for companies*)

*(Pb metal manufacturers are recommended to leave this question blank).*

#### MARKET AND SUPPLY CHAIN

15. Specifying the use of the substance, both overall in the EU and by your company, what is the annual volume/value of the substance:
- Placed on the EU market? Overall annual commodity demand in the EU<sup>32</sup>: 1621.6 kt (in 2020)  
*Companies to add own data on annual volume they supply in the EU*  
Manufactured in the EU? Overall Pb metal volume manufactured annually in the EU<sup>33</sup>: 1650.482 kt (in 2020) (445.5 kt primary, 1204.937 secondary)  
*Companies to add own data on annual volume they manufacture in the EU*  
Imported into the EU? Overall annually imported into the EU<sup>34</sup>: 94.2 kt (in 2020)  
*Companies to add own data on their annual volume imported (if relevant)*  
Exported from the EU? Overall exported annually from the EU<sup>35</sup>: 76.7 kt (in 2020)  
*Companies to add own data on their annual volume exported (if relevant)*

16. Could you specify the sector in which the substance is used and describe the supply chain, including your role in the supply chain?

*Companies to add information relevant to their supply chain here.*

17. Can you provide data on the turnover of the concerned sectors and the number of people employed? How much of these data is related to the EU market? What is the turnover of the substance/substance-related products vs. the total turnover of the sector?

Lead-based products are essential to trillion-dollar industries that power the global economy: from automotive to data storage, from telecoms to renewable energy production, from research and healthcare applications to the chemical and non-ferrous metals industry.

According to a study by EBP<sup>36</sup>, the European lead battery industry (i.e. primary lead manufacturers, mining companies, battery production, battery recycling, battery container and separator production, accessories, assembly equipment) directly employs approximately 31,700 workers. In addition, it supports about 75,000 jobs in other companies supplying into this Industry, and 77,500 jobs from worker spending in different industries.

<sup>32</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>33</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>34</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>35</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>36</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

Beyond jobs, based on 2019 industry activity in 30 countries, the European lead battery industry annually supports 36.5 billion EUR in output or overall economic impact, which includes 14.7 billion EUR in gross domestic product (GDP) – 7.6 billion EUR of which is labour income<sup>37</sup>.

The downstream industry activity enabled through usage of lead batteries is extensive: €7.3 trillion worth of GDP covering retail, construction, and healthcare applications<sup>38</sup>.

Read more about the economic contribution of the European lead battery industry: <https://bit.ly/35h3TfJ>

*Companies to also add own information, where available.*

18. Can you estimate the relative weight of SMEs in the concerned sectors (in terms of number of companies and employment) in your country /in the EU?

According to a study by EBP<sup>39</sup>, 35% of companies in the European lead battery industry (i.e. primary lead manufacturers, mining companies, battery production, battery recycling, battery container and separator production, accessories, assembly equipment,) are medium enterprises and 4% are small enterprises.

*Companies to add available information on proportion of companies that are SMEs in their own supply chains.*

19. Are the manufacturers of the substance or downstream users concentrated in a single/limited number of Member States or in a limited number of regions?

Within the EU, lead metal manufacturers/recyclers are based in 17 Member States: Austria, Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, Sweden.

Estimated EU27 refinery capacities for lead<sup>40</sup>:

Country	Estimated capacity (tonnes)
Austria	30 000
Belgium	185 000
Bulgaria	130 000
Czech Republic	45 000
Estonia	12 000
France	107 000
Germany	580 000
Greece	69 000
Hungary	14 000
Italy	260 000
Poland	190 000
Portugal	15 000
Romania	75 000
Slovakia	12 000
Slovenia	35 000
Spain	212 000
Sweden	85 000

<sup>37</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>38</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>39</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>40</sup> “World Directory: Primary and Secondary Lead Plants”, ILZSG, 2020

Total	2 056 000
-------	-----------

*Companies to specify in which member states they operate.*

EU27 lead-based battery producers, i.e. the main use sector (90% of annual volume) for lead metal, are located in 14 Member States<sup>41</sup>: Austria, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Spain, Slovenia.

*Companies to specify in which member states their lead-using customers (battery and non-battery) operate.*

#### COMPETITIVENESS

20. What would be, or has been, the overall cost and time of substitution for the particular use you are providing information on? This includes (if relevant) the need of changes in the production process, need for new product testing, qualification and certification, etc.

*(Pb metal manufacturers are recommended to leave this question blank).*

21. What is the expected impact of substitution costs on the costs of your inputs or final products? What is expected impact on your sales in the EU/outside the EU countries? *(only for companies)*

*(Pb metal manufacturers are recommended to leave this question blank).*

22. Please describe the typical length of the order cycle / investment cycle.
- To the concerned sectors?
  - To your company? *(only for companies)*

*Companies to add information relevant to their supply chain here, if available*

23. Please describe what the impacts of including the substance in Annex XIV of REACH would be? This includes changes in the competitive position with respect to non-EU competitors in the EU market and in third markets.
- To the concerned sectors?
  - To your company? *(only for companies)*

*Companies to add own information.*

#### OTHER IMPACTS OF INCLUSION IN ANNEX XIV (innovation and business opportunities)

24. If the substance is included in Annex XIV to be eventually phased out, would it create business opportunities (e.g. gaining new markets or higher market share, development of alternative substances / products / production techniques)?

- In your sector? *(recommended to leave this question blank).*
- For your company? *(only for companies)* *Companies to add own information.*

25. What effects do you expect on enterprises' capacity to innovate? (The capacity to produce more efficiently and/or higher quality and a larger scale of products and services and the capacity to bring R&D to the market)

<sup>41</sup> <https://chargethefuture.org/map-of-eu-lead-battery-capacity/>

*Companies to add own information or otherwise leave blank.*

26. Are you aware of any likely effects on recycling or sustainability?

**Lead plays an essential role in the European circular economy of other metals.** The carrier metal properties of lead make it an efficient and effective enabler of high-tech recycling in the EU. The EU's non-ferrous metals recyclers can recover over 20 metals from post-consumer and industrial waste streams, including scrap, catalytic converters, e-waste, and other increasingly complex products at end-of-life<sup>42</sup>. In this way, lead is a key enabler in maintaining the value of materials and resources for as long as possible by returning them into the product cycle at end-of-life, helping to minimise waste.

As shown by the 'metal wheel' in the UNEP (2013) report<sup>43</sup>, the lead value chain is inextricably linked to the production of other valuable and critical raw materials – metals such as zinc, copper, tin, bismuth, indium, gold, silver, and platinum group metals – many of which contribute to future breakthrough technologies for a more sustainable economy. As the EU's ETN Socrates project has also highlighted<sup>44</sup>, lead has a fundamental role of lead in the circular economy and in urban mining, enabling the recovery and recycling of other critical metals and materials from electronics waste and other complex products: *“lead metallurgy is fundamental if the EU wants to retain its leading position in the global circular economy”*.

According to researchers<sup>45</sup>, lead should be seen alongside zinc, copper, nickel and tin as the “Big Five” at the heart of the non-ferrous metals industry. These five metals are the carrier metals in both primary production and recycling for many of the critical and valuable metals needed for today's sustainable technologies. The loss of any of these metallurgies would make the EU circular economy difficult to realize in full, as it would diminish the EU's capacity to recycle complex materials as well as supply metals to its industry using its own sources. A healthy circular economy for the EU is built upon the foundation of an advanced metallurgical infrastructure, of which lead metallurgy is a critical component.

The closed loop economy of the EU lead and lead battery value chains provides the raw materials needed locally to make new products, thereby limiting the potential for environmental exposure by keeping lead in the value chain and out of Europe's waste stream, indefinitely. For example, every year, more than 100 million used lead batteries are kept out of the EU's waste stream by a value chain embracing circular economy principles and operating in a fully closed loop<sup>46</sup>.

The EU has some of the world's most advanced and efficient non-ferrous metals production sites – many of which are lead battery recyclers – creating value, skills and 'green' jobs. With a quarter of the world's recycled metals already generated in Europe<sup>47</sup>, lead metallurgy can ensure Europe's continued global leadership role in the circular economy: the loss of lead metallurgy would remove a central process for Europe's multi-metallic recycling industry, making it less efficient and less competitive, and could therefore threaten the EU's position as a global leader in recycling.

27. In your opinion, if the substance is included in Annex XIV to be eventually phased out, would the economy, society or the environment be better or worse off (all factors considered)? Why?

*Companies to add own views, or leave blank.*

<sup>42</sup> <https://leadmatters.org/circular-economy/> / <https://www.unicore.com/en/about/recycling/>

<sup>43</sup> <https://wedocs.unep.org/handle/20.500.11822/8423>

<sup>44</sup> <https://etn-socrates.eu/socrates-press-release-on-the-importance-of-lead-metallurgy/>

<sup>45</sup> Reuter, Markus, Matusiewicz, Robert, Schaik, Antoinette. (2015). PLENARY LECTURE: Lead, Zinc and their Minor Elements: Enablers of a Circular Economy. World of Metallurgy - ERZMETALL. 68. 132-146.

<sup>46</sup> <https://chargethefuture.org/#:~:text=on%20Europe's%20roads.-,SUSTAINABLE>

<sup>47</sup> <https://www.eurometaux.eu/media/2005/full-report-8-56-17.pdf>

**APPLICATION FOR AUTHORISATION** (*only for industry actors*)

28. If the substance is included in Annex XIV, would you consider applying for an authorisation? Are you aware if your suppliers/downstream users would consider to apply?

*Companies to add own information – but please first note the template comments under Qu 29*

29. How would you envisage that the submission of an application for authorisation could be organised, considering your specific uses and the structure of the supply chain: would you envisage an application by manufactures/importers of the substance or formulators (upstream the supply chain)/ or applications by downstream users or a combination of all)?

How the lead-using industries would coordinate its Applications for Authorisation, in the event that Pb metal were included in REACH Annex XIV, has not yet been determined. However it is envisaged that, in general, users would submit Applications for Authorisation for their own uses, which could result in many hundreds of Applications for Authorisation being submitted if there were no exemptions granted.

Industry experience in other sectors has shown that the feasibility of upstream Applications for Authorisation is often limited. For example, the necessarily detailed information on why potential alternatives are not feasible, on precise exposure and emissions during the use, on potential timelines for substitution by the users, and other information necessary for a robust Application for Authorisation, is normally only available within the downstream or end use sector and not to the substance manufacturer. Downstream users may also prefer, from a strategic business perspective, to make their own application instead of relying on the Application for Authorisation submitted by an upstream supplier.

30. What main challenges in preparing an application do you expect for your specific case? Would you envisage applying for your own uses or would you apply to cover uses of your downstream users? Would you apply jointly with other downstream users covering the same use?

*Companies to add own information – but please first note the template comments under Qu 29*

**REGULATORY OPTIONS**

31. Do you consider that other regulatory options could better address the concerns for human health or the environment for which the substance is recommended for inclusion in Annex XIV? What are these regulatory options and why would they better address the concerns?

Yes. The EU already has a very comprehensive framework of lead-specific legislation designed to manage risk. Importantly, key aspects of the EU's regulatory framework designed to minimise and reduce lead exposures are already being reviewed to ensure an even higher level of protection of human health and the environment. In particular, the EU's binding occupational exposure limits are currently being revised by DG Employment to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing and using lead, and the IED is being reviewed – the IED regulates pollutant emissions, including lead, from all relevant industrial installations, not just lead manufacturing and use.

In the context of general population exposure to lead via the environment, it would be more effective to strengthen legislative controls on industrial activities which contribute most to the air and water emissions. As noted above, according to recent E-PRTR data<sup>48</sup>, across the EU-27 there was an 88% reduction in lead emissions to air and an 80% reduction in lead emissions to water between 2007-2020. According to Industry's further analysis of the data<sup>49</sup>, the majority of remaining lead emissions in the EU now result from activities which are NOT in scope of REACH

<sup>48</sup> <https://industry.eea.europa.eu/analyse/pollutant>

<sup>49</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

Authorisation for lead metal, i.e. thermal power stations, iron and steel, and waste management. As such we support the Commission's activities underway to review and revise long standing EU legislation, including the IED, to make it better fit climate change objectives, circular economy and the chemical strategy for sustainability, considering the key sources of lead emissions to the environment.

Should COM still feel it appropriate to include lead metal in REACH Annex XIV, then we believe that its industrial use in specific applications, particularly the production of lead-based batteries and the uses exempted under the ELV and RoHS Directives, meets ALL requirements of REACH Article 58(2) in that the existing Community legislation already addresses the use categories to be exempted, exemptions which are time-limited and are already subject to periodic review by the Commission.

Subjecting these uses additionally to REACH Authorisation would be a clear example of double regulation.

#### **OTHER REMARKS**

32. Would you like to provide additional comments/information on the possible socio-economic impacts?

Inclusion of lead metal in REACH Annex XIV would impede the efficient delivery of EU policy objectives for a strategically autonomous, sustainable and carbon-neutral future.

Inclusion in REACH Annex XIV is not a proportionate nor effective measure given the extensive regulatory framework already in place and for the additional reasons discussed below:

#### Proportionality and effectiveness

***Subjecting lead metal to REACH Authorisation will not reduce exposure or emissions significantly or in a proportionate way.***

Using the REACH Authorisation process to regulate lead metal is not a proportionate regulatory action considering 90%<sup>50</sup> of the EU volume is used industrially to produce lead-based batteries. Existing legislation already drives substitution and in particular provides time-limited exemptions in the case of automotive batteries. Moreover, under the proposed EU Battery Regulation it is already foreseen that if there is an unacceptable risk to human health or the environment arising from use of a substance in the manufacture of batteries or during subsequent life cycle stages, the Commission shall adopt a restriction. Therefore it is clear that existing and currently-proposed EU legislation already addresses risks, and where appropriate drives substitution, associated with battery production that uses the majority of lead placed on the EU market.

A recent study<sup>51</sup> concluded that – despite the sector using approximately 90% of the total EU use volume per year – the lead battery value chain contributes just 2.2% of the total Pb emissions to air and 0.02% total Pb emissions to water.

The study<sup>52</sup> also compared anthropogenic emissions with emissions via natural processes, concluding that:

- emissions to water via natural processes are 8 times higher than the total from anthropogenic sources (16,140 vs 2,007 tonnes per year),
- emissions to soil via natural processes are 1.7 times higher than the total from anthropogenic sources once ammunition (which is undergoing a REACH Restriction at the time of writing (February 2022) is excluded (723 vs 434 tonnes per year).

---

<sup>50</sup> ILA, 2021 (“First Uses of Lead Metal in the EU”)

<sup>51</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

<sup>52</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

Another recent study<sup>53</sup>, which considered recent and historical data on lead isotopic composition in airborne particles in London, showed strong evidence that Pb sources have not changed substantially since the ban in 1999 of leaded gasoline, suggesting that historical gasoline-derived lead remains an important source of lead in today's urban environment due to its persistence and effective remobilisation. The paper suggests that atmospheric lead has now reached a baseline that would be difficult to decrease further, even with additional policy measures (such as REACH Authorisation) targeting ongoing use of Pb substances.

Subjecting the main (90%) use sector (i.e. lead battery production), and almost every other use of lead, to REACH Authorisation in order to address any limited and specific concerns would be disproportionate and would not result in substantive reductions in emissions or exposure – considering especially that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are not in scope of REACH Authorisation of lead metal.

Including lead metal in REACH Annex XIV would also not encourage substitution more quickly, as the ELV and RoHS Directives, for example, already require substitution where there is a technically feasible alternative – the ELV exemptions scheme and its review process, for example, do not take into consideration socio-economic feasibility of any potential alternatives, only technical feasibility. Therefore the existing lead-specific exemptions review/renewal processes would be more likely to enforce substitution earlier than REACH Authorisation, if a technically feasible alternative were to become available.

#### Workload considerations

Including lead metal in REACH Annex XIV would add additional burden on regulators who would have to assess many **hundreds of Applications for Authorisation**, including from lead battery producers, producers and users of leaded steels, lead-containing brasses and bronzes, and lead-containing aluminium alloys, and producers of electronic and electrical goods – the majority of whom would have to apply to continue uses that are already exempted from the regulatory bans on lead under the ELV and RoHS Directives.

#### Competitiveness

REACH Authorisation does not apply to the import or use of articles. The inclusion of lead in Annex XIV would place a requirement – a regulatory burden and additional cost – on our customers in the EU who use lead to produce articles, cost and burden which would not apply to non-EU article producers. EU article producers using lead would become less competitive than their non-EU equivalents, and the balance of EU exports and imports of articles made with lead could shift substantially if the import of articles into the EU were in essence encouraged because of REACH Authorisation requirements for EU lead usage.

Inclusion in REACH Annex XIV would signal to businesses and investors that the EU intends to phase out lead, which could trigger premature and significant market changes and make the EU overall less competitive than non-EU counterparts.

#### Demand and disposal

Some minor uses of Pb metal, e.g. intermediate uses, uses of articles, would be out of scope of the Authorisation requirement. However, if Pb metal were to be included in Annex XIV *without exemptions or Authorisation being granted*, the EU demand for lead metal would be decreased substantially.

A significant reduction in demand would mean that the recycling of lead batteries and other lead-containing materials at end-of-life would be less commercially viable – and that the recovered lead would no longer have

---

<sup>53</sup> Strong evidence for the continued contribution of lead deposited during the 20th century to the atmospheric environment in London of today  
Eléonore Resongles, Volker Dietze, David C. Green, Roy M. Harrison, Raquel Ochoa-Gonzalez, Anja H. Tremper, Dominik J. Weiss. *Proceedings of the National Academy of Sciences* Jun 2021, 118 (26) e2102791118; DOI: 10.1073/pnas.2102791118

significant value from use in the EU. As noted above, more than 100 million used lead batteries are kept out of the EU's waste stream every year by a value chain embracing circular economy principles and operating in a fully closed loop<sup>54</sup>. But without EU demand for lead, the 1.2+ million tonnes<sup>55</sup> of lead being recycled every year in the EU would instead need to be discarded, somehow, as hazardous waste, or even exported to non-EU countries for battery production – it would no longer be kept in the EU value chain which is already an activity that minimises waste and exposure and emissions.

This significant reduction in lead demand would also impact the EU economy: currently, approximately €2 billion worth of lead from recycled sources is used per year for EU lead battery production.

### **Annex I: Key EU legislation dealing with ambient air, water, drinking water, waste, and food, in the context of lead emissions to / levels in the environment and food chain**

- The **Industrial Emissions Directive** 2010/75/EC (as amended)
- Council Directive 2008/50/EC (as amended) on **ambient air quality** and cleaner air for Europe
- Council Directive 2000/60/EC (as amended) establishing a framework for Community action in the field of **water policy** (Water Framework Directive)
- Council Directive 98/83/EC (as amended) on the **quality of water intended for human consumption**
- Council Directive 2006/118/EC (as amended) on the **protection of groundwater** against pollution and deterioration
- Council Directive 86/278/EEC (as amended) on the **protection of the environment, and in particular soil**, when sewage sludge is used in agriculture (**Sewage Sludge Directive**)
- Directive 2005/31/EC amending Directive 84/500/EEC in regards **ceramic articles intended to come into contact with foodstuffs**
- Commission Regulation (EC) 1881/2006 (as amended) setting **maximum levels** for certain contaminants in **foodstuffs**
- Regulation (EC) No 1334/2008 on **flavourings for use in foodstuffs**
- Directive 2009/32/EC on **extraction solvents in foodstuffs**
- Regulation No 1881/2006 (as amended) as regards **food contamination** (maximum levels)
- Commission Directive 2002/32/EC (as amended) on **undesirable substances in animal feed**
- Regulation (EU) 1275/2013 amending Annex I to Directive 2002/32/EC as regards maximum levels in **animal feed**
- Council Directive 2008/103/EC amending Directive 2006/66/EC on **batteries and accumulators** and waste batteries and accumulators
  - *NB Batteries Regulation proposal currently under scrutiny*
- Council Regulation 1013/2006 (as amended) on **shipments of waste**
  - *NB currently under review*
- Directive 2008/98/EC (as amended) on **hazardous waste**
- Directive 2012/19/EU on **waste electrical and electronic equipment**
- Directive 94/62/EC (as amended) on **packaging and packaging waste**

---

<sup>54</sup> <https://chargethefuture.org/#:~:text=on%20Europe's%20roads.-,SUSTAINABLE>

<sup>55</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

## Attachment 1b: recom\_com\_call\_for\_info\_2022 - common template\_130422\_Pb.pdf

b. Updated version dated 13 April 2022

### PRIORITISATION

#### PUBLIC CONSULTATION ON SOCIO-ECONOMIC IMPACTS

The objective of this consultation is to inform policy makers about the economic and social consequences of the authorisation requirement. You are invited to provide specific information about the use of the substance and available alternatives, impacts on the environment, public health and society, and impacts on the supply chain and competitiveness.

This questionnaire contains 32 questions and is aimed at individuals, organisations, companies, as well as Member States. Due to the variation of the questions, it is possible that you are not able to answer to all of them.

Thank you for your contribution!

+++

#### Key messages:

**The existing legislation framework, which includes the EU binding limit values for all occupational settings, is collectively the best regulatory management tool for lead and lead compounds. However, if the Commission were to identify a specific risk which needs to be addressed beyond the measures already in place, use of specific, targeted measures such as restrictions would be more effective and proportionate than inclusion in REACH Annex XIV.**

**The Commission should postpone any decision to include lead metal in Annex XIV until it has fully assessed the impact of the review of the EU binding limit values for lead and lead compounds.**

**The Commission should also take into consideration the impact of other relevant legislative provisions which, while still in progress at the time of this Call for Information, are expected to be implemented before a decision on REACH Authorisation Listing would be taken – including the proposed REACH Restriction on lead in ammunition and fishing tackle, the proposed Batteries Regulation, the review of relevant End-of-Life Vehicle (ELV) and Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directives' exemptions, as well as the review of the Industrial Emissions Directive.**

**Additionally, while the targeted REACH Revision is under implementation, the Commission should postpone the inclusion of additional substances in REACH Annex XIV.**

**ILA and the Lead REACH Consortium have published a position paper: [https://ila-reach.org/wp-content/uploads/2022/02/Position-paper-Pb-metal-Authorisation-final\\_web.pdf](https://ila-reach.org/wp-content/uploads/2022/02/Position-paper-Pb-metal-Authorisation-final_web.pdf).**

**Please contact ILA ([allen@ila-lead.org](mailto:allen@ila-lead.org)) for access to references not publicly available.**

## SUBSTANCE

1. What is the name of the substance on which you comment. Please specify if your replies concern more than one substance, e.g. a group of substances with similar uses:

Lead metal (EC 231-100-4)

## USES

2. What is the use of the substance (sectors, types of uses, categories of products, etc.)?
  - a. In general?

Use of lead metal in the production of lead-based automotive and industrial batteries is the main application: today, EU battery production accounts for approximately 86%<sup>56</sup> of the use by volume<sup>56</sup>.

Other smaller-volume uses of lead metal include (in no particular order):

- Use as an alloying element in free-machining brasses, bronzes, steel, and aluminium alloys, including in the automotive sector under ELV Annex II exemptions and in sectors regulated by the RoHS Directive (2011/65/EU)
- Use in solder, e.g., in the case of electrical and electronic equipment, as permitted under the RoHS Directive
- Use in the production of inert lead anodes, which are used in for electrowinning and electrogalvanising processes, and in every chrome plating facility
- Use in other galvanising processes such as hot-dip galvanising
- For steel wire patenting
- Use as a chemical reagent in fire assay for precious metals analysis
- Use of molten lead in closed systems, as a heat transfer agent e.g. in the nuclear sector
- Use in cable sheathing, e.g. for high-voltage cables connecting renewable energy farms to the electricity grid
- Use in the production of radiation shielding, e.g. for medical, dental, veterinary, and non-destructive testing facilities, in nuclear medicine and in security applications
- Use as an industrial lubricant, e.g. in aerospace applications
- Lining of tanks/vessels/pipework in the chemical industry, e.g. for phosphoric acids, bromides
- Use as a chemical intermediate to make lead compounds, including in the battery production process
- Use in the production of architectural lead sheet, e.g. for weatherproofing, soundproofing and in earthquake protection
- Use in the production of ballast
- Use in the production of various cast and extruded articles such as weights and counterweights
- Use in the production of lead wool, primarily used as caulking to seal joints between lead and steel fittings and also in specialist gas sensors
- Use in the production of ammunition for hunting.

Professional uses of lead are limited to specific uses of lead in solder, e.g. for reparative uses in plumbing.

There are no consumer uses of lead metal as a substance or in a mixture – these are restricted under Entry 30 of Annex XVII. There are also restrictions on the use of lead in certain consumer articles, e.g. jewellery, and articles which can be mouthed by children (Entry 63). A REACH Restriction on the use of

---

<sup>56</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

lead in gunshot in or around wetlands was adopted in January 2021 and a restriction on lead in other terrains and ammunition, and in fishing tackle, is already planned by the Commission and currently under consideration by the ECHA Committees.

b. By your company? (*only for companies*)

*Companies to state for which uses they supply Pb metal in the EU, highlighting ones that are particularly important for your company e.g. in terms of income/business strategy/competitiveness.*

3. Can you specify the use in terms of volume/value?

c. Overall in the EU?

The EU produces approx. 1.65 million tonnes of Pb metal every year, of which 73% (approximately 1.2 million tonnes) comes from secondary sources<sup>57</sup>.

Approximately 86%<sup>58,6</sup> of the total volume of lead metal used every year in the EU is used to make lead-based batteries, exclusively in industrial settings. Batteries are sealed articles with no potential for consumer exposure and lead batteries operate in a closed loop in the EU with nearly all being collected and recycled by highly regulated facilities at end-of-life.

The table below gives the volumes for ‘first uses’ of Pb metal in the EU in 2015 as quoted in a consultant’s report<sup>59</sup> prepared for the International Lead Zinc Study Group (ILZSG) in 2017, alongside estimates (tonnages and percentages) made by the International Lead Association for 2021:

Use	Tonnes (ILZSG, data for 2015)	Tonnes (ILA 2021 estimate <sup>60</sup> )	Approx. percentage (ILA 2021 estimate, <b>updated per Footnote 6</b> )
<b>Automotive batteries</b>	809,000	809,000	54.6
<b>Industrial batteries</b>	460,000	460,000	31.1
<b>Rolled and extruded products</b>	95,000	80,000 <sup>61</sup>	5.4
<b>Shot and ammunition</b>	57,000	57,000	3.8
<b>Cable sheathing</b>	18,000	50,000 <sup>6</sup>	3.4
<b>Lead compound manufacture</b>	68,000	20,000**	1.4
<b>Miscellaneous (including alloys and solders)</b>	10,000	5,000	0.3

*\*\*there has been a rapid decline in use of lead compounds due to substitution under the VinylPlus commitment and in anticipation of restrictions on lead-based stabilisers in PVC, which was previously a significant market.*

<sup>57</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>58</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

<sup>59</sup> “Main first uses of lead and zinc in Europe”, report by Oakdene Hollins report for the International Lead Zinc Study Group, 2017

<sup>60</sup> “First Uses of Lead Metal in the EU”, ILA (2021)

<sup>61</sup> Updated based on clarified market data, supersedes figures quoted in “First Uses of Lead Metal in the EU”, ILA (2021)

Non-ferrous metals prices discovered on the London Metals Exchange (LME) platforms are used as the global reference price<sup>62</sup>.

d. By your company? (*only for companies*)

*Provide (approximate) volume data for your company and the uses into which you supply Pb metal.*

4. What are the properties/functions of the substance on those uses/sectors?

*(Optional for Pb metal manufacturers – provide brief info if available to you, or otherwise leave this question blank)*

5. Is the substance present in a finished article? If yes, at what concentration?

*(Optional for Pb metal manufacturers – provide brief info if available to you, or otherwise leave this question blank)*

#### **ENVIRONMENT AND HEALTH**

6. Does the use of the substance imply any releases/exposure/risks for workers, consumers or environment?

The health hazards of lead metal are well established, and an EU-wide harmonised classification exists through an entry in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 (CLP) and additional self-classification by the REACH registrants.

Its classification, and the inclusion of lead metal on the REACH Candidate List, triggers requirements for specific labelling (where packaged) and, through REACH Article 31, the provision of Safety Data Sheets to provide downstream users (including workers) with information on hazards and risk management measures. Article 33 also sets out requirements to disclose the presence of SVHCs, including lead metal, above 0.1% w/w to recipients of articles.

Lead metal is manufactured and recycled under stringent conditions in highly-regulated industrial facilities. Moreover, in the lead manufacturing (and battery production and recycling) sector, Industry best practice now far exceeds the requirements of the EU's lead-specific legislation which was implemented to address risk.

#### *Risks for workers involved in lead metal manufacturing*

There is potential for workplace exposure to lead during primary and secondary production of lead metal, from smelting and refining lead-containing ores and from recycling of end-of-life lead-based batteries, scrap, industrial residues, and e-waste.

According to a report commissioned by DG EMPL<sup>63</sup> to support revisions to existing EU binding occupational exposure limits for lead and compounds, is estimated that in the lead metal manufacturing

---

<sup>62</sup> <https://www.lme.com/Metals/Non-ferrous/LME-Lead#Trading+day+summary>

<sup>63</sup> Commission study report “Study on collecting information on substances with the view to analyse health, socio-economic and environmental impacts in connection with possible amendments of Directive 98/24/EC (Chemical Agents) and Directive 2009/148/EC (Asbestos) Final report for lead and its compounds” (Aug 2021)

sector there are 6,500 workers potentially exposed to lead metal (2,500 in the manufacturing of lead from ores and concentrates, and 4,000 in the recycling of lead batteries at end-of-life).

### Risks for the general public

There is the potential for general population exposure via the environment, in the context of emissions from sites engaged in lead metal manufacturing. However, all EU non-ferrous metals manufacturing and industrial use sites are regulated by the Industrial Emissions Directive 2010/75/EU (IED), the main EU instrument regulating pollutant emissions from industrial installations. The IED aims to achieve a high level of protection of human health and the environment taken as a whole by reducing harmful industrial emissions across the EU, in particular through better application of Best Available Techniques (BAT).

Under the IED, EU lead manufacturing plants are required to operate in strict accordance with permits granted by the authorities in the relevant Member State. The permits contain conditions, set in accordance with the principles and provisions of the IED, which includes lead emission limit values based on the BAT. The effectiveness of the implemented risk management measures is regularly checked through monitoring of stack emissions and any effluent discharges, industrial installations having to report environmental data to the Competent Authority on a regular basis.

Risks to the general population from lead exposure via the environment are also addressed by legislation dealing with lead levels in ambient air, water, drinking water, waste, and food. Key EU legislation dealing with ambient air, water, drinking water, waste, and food is listed in Annex I.

#### 7. What measures have been put in place to prevent these releases/exposure/risks?

### Worker exposure management

Strict risk management processes are observed when working with lead, and there is a long-standing framework of legislation developed to specifically address the occupational risk of working with lead. This framework covers the manufacture of lead metal, the industrial use e.g. to produce articles, professional use, and recycling at end-of-life to recover lead and other materials.

This existing legislation provides binding and enforceable minimum requirements for the control of risks from industrial manufacturing and use of lead. In having a binding occupational exposure and biological limit for lead, supported by additional measures such as medical surveillance, Council Directive 98/24/EC (Chemical Agents Directive, CAD) ensures that harmonised, EU-wide standards operate – and Member States can establish more (but not less) stringent requirements.

Lead metal and its compounds is the only group of substances under the Chemical Agents Directive to have a binding Occupational Exposure Limit (OEL) in Annex I to CAD, and lead and its ionic compounds are the only substances for which a binding biological limit value and specific health surveillance measures are set out (Annex II to CAD). The EU's binding occupational exposure limits are currently being revised to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing lead or using it in processes in scope of REACH Authorisation. All EU Member States have existing National occupational and biological limits to designed to protect workers exposed to lead and compounds. In most Member States these will be revised downwards as a result of the anticipated revision to the EU binding occupational and biological limit values, offering further protection to EU workers.

In addition to regulatory standards, the lead manufacturing industry has established proactive, voluntary targets for reducing employee exposure, such as the long-standing voluntary exposure management programme administered by the International Lead Association (ILA). The ILA programme has resulted in significant reductions in lead exposures in employees working in lead manufacturing facilities<sup>64</sup>.

*Companies to add company-specific information on their own blood lead reduction performance.*

This reduction is a significant achievement, but our company is committed to continue reducing employee lead exposures to levels as low as reasonably practicable.

Via safety data sheets, employers in lead manufacturing and use sectors are informed on the importance of workers' good personal hygiene, blood lead monitoring, and use of personal protective equipment. On personal hygiene, the SDS instructs employers to:

- ensure workers follow simple hygiene rules
- ensure workers do not wipe away sweat with hands or arms
- ensure workers use disposable tissues rather than a handkerchief
- prohibit drinking, eating and smoking in production areas, and prohibit access to eating and non-production areas in working clothes
- ensure workers wash hands, arms, faces and mouths (but preferably shower) and change into clean clothing before entering eating areas
- for high exposure workplaces, separate rooms for cleaning hands, removal of clothes, showers and clean clothes may be necessary
- ensure workers handle dirty working clothes with care
- allow no personal belongings to be taken into production areas, or items that have been used in production areas to be taken home
- ensure general shop cleanliness is maintained by frequent washing/vacuuming
- clean every workplace at the end of every shift.

Regarding blood lead monitoring; all workers potentially exposed to lead substances are enrolled in comprehensive medical surveillance scheme, including routine blood lead measurements, covering all site activities and requiring more frequent blood lead monitoring for workers undertaking high-risk jobs and those with elevated blood lead levels.

*Companies to add company-specific information on how they address/manage worker exposure, or otherwise edit the text above to make it company-specific.*

#### Environmental emissions management

In general, a number of measures may be taken to reduce Pb emissions to water:

- Chemical precipitation (used primarily to remove the metal ions)
- Sedimentation
- Filtration: used as final clarification step
- Electrolysis: for low metal concentration
- Reverse osmosis: extensively used for the removal of dissolved metals
- Ion exchange: final cleaning step in the removal of heavy metal from process wastewater

---

<sup>64</sup> <https://ila-lead.org/ila-member-companies-continue-to-deliver-reductions-in-employee-lead-exposures/>

-and in the case of reducing emissions to air, again in general a number of measures may be taken:

- (Wet) Electrostatic precipitators using wide electrode spacing
- Cyclones, but as primary collector Fabric or bag filters, which have high efficiency in controlling fine particulates
- Ceramic and metal mesh filters (PM10 particles are removed)
- Wet scrubbers.

Lead removal from waste water treatment works should be at least the minimum default 84% removal used in the REACH Chemical Safety Report. Solid material collected from on-site treatment must be sent for metal recovery or treated as hazardous waste. Waste water treatment sludge is normally recycled, but may be incinerated or landfilled. It is not used as agricultural fertiliser.

*Companies are encouraged to make the paragraph immediately above specific to their site(s) rather than just using this generic text, which is taken from the Pb REACH Consortium's SDS template.*

The Non Ferrous Metals Best Available Techniques Reference Document (NFM BREF)<sup>65</sup> sets out applied processes and techniques to prevent emissions to air, diffuse air emissions, emissions to water, and the prevention of emissions to soil and groundwater. Chapter 2 describes general processes and techniques, and Chapter 5 is specific to processes used to manufacture lead metal (and tin):

- Section 5.1.1 describes the applied processes and techniques used for primary Pb metal production,
- Section 5.1.3 describes the same for secondary Pb metal production,
- Section 5.1.4 describes the same for lead refining,
- Section 5.1.5 describes the same for melting and alloying processes for lead, and
- Section 5.3 describes in more detail the techniques to prevent or, where this is not practicable, to reduce the environmental impact of installations in the sector that were considered in determining the BAT.

This information includes, where relevant, the environmental performance levels (e.g. emission and consumption levels) which can be achieved by using the techniques, the associated monitoring and the costs and the cross-media issues associated with the techniques.

General measures include applied processes and techniques for raw material handling (including battery breaking, and crushing, size reduction and screening), for reducing sulphur dioxide emissions, for water and waste water management, and for residue management. For example, Section 2.4.3 describes how dust, fumes and gases from metal production processes can be collected and conveyed to abatement or treatment processes, and also lists other reported measures to prevent diffuse emissions and collect off-gases from metal production.

*Companies to add company-specific information on how they address/manage ENV emissions, or otherwise edit the text above to make it company-specific.*

---

<sup>65</sup> Author(s); Gianluca Cusano, Miguel Rodrigo Gonzalo, Frank Farrell, Rainer Remus, Serge Roudier, Luis Delgado Sancho; Title: Best Available Techniques (BAT) Reference Document for the main Non-Ferrous Metals Industries, EUR 28648 EN, doi: 10.2760/8224

The effectiveness of measures to prevent lead emissions in the lead battery production and recycling sectors has recently been demonstrated in a study recently published<sup>66</sup> in the Journal of Exposure Science & Environmental Epidemiology. Using emission data obtained from facilities producing and recycling lead batteries across the EU, the study concluded that emissions from lead battery production and recycling – i.e. the largest-volume use sector, representing 86% of the annual lead usage in the EU – have a minimal impact on general population blood lead levels at regional level: *"The predicted contribution of Pb in human blood arising from emissions from lead battery manufacturing and recycling for the regional scale was 0.15 µg Pb/L for children (1–3 years) and 0.06 µg Pb/l for adults. This value is about 1% of total Pb blood levels, according to available recent monitoring data for children <7 years across Europe"*.

8. How can exposure of workers or consumers be further reduced? How can releases into the environment be further minimised?

#### Worker exposure

The most appropriate and effective way, on an EU-wide basis, to address worker exposure is to strengthen and implement revised workplace exposure limits. The biological limit value should be the primary tool for the protection of workers from occupational lead exposures. The biological limit value (and the OEL) applies not just to workers directly exposed to lead, such as those in lead manufacturing plants and sites using lead metal or lead compounds, but also those who might be incidentally exposed to lead in the course of their work, e.g., in demolition, in shipbuilding, repair and breaking, in the scrap industry, in installation and maintenance of lead-containing articles, and more.

From a regulatory perspective, the review of the existing EU binding biological limit value is key to reducing worker exposure on an EU-wide basis in all workplaces in the EU where employees may be exposed to lead in the course of their professional activities.

Additionally, as noted above the lead manufacturing industry is committed to best practice and continuous improvement. Company incentives and initiatives are key to achieving a reduction in blood lead levels in lead-manufacturing facilities in the EU and beyond.

#### Environmental emissions and consequent man-via-environment exposure

While the current IED provisions and the related NFM BREF process have been a major step forward for the reduction and elimination of pollutants, we welcome the review of the IED and the E-PRTR Regulation.

Recent E-PRTR<sup>67</sup> data indicates that across the EU-27 there was an 88% reduction in emissions of lead to air and an 80% reduction in lead emissions to water between 2007-2020. However the same data also confirms that there are still significant emissions of lead to water and air – and moreover that the majority of lead emissions in the EU now result from activities which are NOT in scope of REACH Authorisation for lead metal.

---

<sup>66</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

<sup>67</sup> <https://industry.eea.europa.eu/analyse/pollutant>

A recent study<sup>68</sup>, which used E-PRTR data, data from lead battery producers and recyclers, and other information sources, concluded that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are all regulated by the IED. Strengthening the IED and its provisions should therefore affect a reduction in lead emissions from these Top-3 emitters of lead to air.

The same study<sup>69</sup> also confirmed that use of lead-containing ammunition is the major source of lead emission to water (84+%) and soil (98+%) – as articles, the use of lead-containing ammunition could not be subject to REACH Authorisation and in any case a REACH Restriction has already been proposed.

9. Are you aware of any relevant information (e.g. study or article) quantifying the cost of environmental or human health impacts related to the use of the substance?

*(Pb metal manufacturers are recommended to leave this question blank)*

#### AVAILABILITY OF ALTERNATIVES

10. Are you aware about any alternative substances, processes or technologies currently available for the use(s) of the substance?
  - a. If yes, what are these alternatives and where are they used?
  - b. What are the main differences between using these alternatives compared to the substance in question (e.g. whether the alternative substance provides the function and, if so, whether there is any difference in the level of performance; in case of an alternative process or technology, the function may be redundant)?
  - c. What are the hazard properties of the alternatives compared to the substance in question?
  - d. Are the alternatives already available, i.e. drop-in alternatives? Or do their implementation require changes in the production process and investments?
  - e. What is the expected price of alternatives, per unit (e.g. per kilo, tonne)?
  - f. Would an alternative require the same, more or less volume (e.g. in kilos, tonnes) compared to the substance in question?

*(Pb metal manufacturers are recommended to leave this question blank)*

11. Would the use of these alternative substances, processes or technologies have a positive or negative impact, or no effect, on sustainability (considering the whole life cycle: manufacture of the substance/production/consumption/waste/recycling)?

*(Optional for Pb metal producers – provide brief info if available to you, or otherwise leave this question blank)*

12. Are you planning to substitute the substance? If so, by when? *(only for companies)*

*It is not possible for lead manufacturers to answer this question, nor is it relevant, as substitution is driven by the users and the technical and economic feasibility of potential alternatives.*

---

<sup>68</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

<sup>69</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

13. Are there uses for which there are no alternatives (substances, processes or technologies)? If yes, could you explain why?

*(Pb metal manufacturers are recommended to leave this question blank)*

14. If there are no alternatives, are you aware of any research, development and innovation efforts attempting to develop them? If so, how long do you expect that the development / testing can take?
- In the EU or in non-EU countries?
  - By your company? *(only for companies)*

*(Pb metal manufacturers are recommended to leave this question blank).*

#### MARKET AND SUPPLY CHAIN

15. Specifying the use of the substance, both overall in the EU and by your company, what is the annual volume/value of the substance:
- Placed on the EU market? Overall annual commodity demand in the EU<sup>70</sup>: 1621.6 kt (in 2020)  
*Companies to add own data on annual volume they supply in the EU*  
Manufactured in the EU? Overall Pb metal volume manufactured annually in the EU<sup>71</sup>: 1650.482 kt (in 2020) (445.5 kt primary, 1204.937 secondary)  
*Companies to add own data on annual volume they manufacture in the EU*  
Imported into the EU? Overall annually imported into the EU<sup>72</sup>: 94.2 kt (in 2020)  
*Companies to add own data on their annual volume imported (if relevant)*  
Exported from the EU? Overall exported annually from the EU<sup>73</sup>: 76.7 kt (in 2020)  
*Companies to add own data on their annual volume exported (if relevant)*

16. Could you specify the sector in which the substance is used and describe the supply chain, including your role in the supply chain?

*Companies to add information relevant to their supply chain here.*

17. Can you provide data on the turnover of the concerned sectors and the number of people employed? How much of these data is related to the EU market? What is the turnover of the substance/substance-related products vs. the total turnover of the sector?

Lead-based products are essential to trillion-dollar industries that power the global economy: from automotive to data storage, from telecoms to renewable energy production, from research and healthcare applications to the chemical and non-ferrous metals industry.

<sup>70</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>71</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>72</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

<sup>73</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

According to a study by EBP<sup>74</sup>, the European lead battery industry (i.e. primary lead manufacturers, mining companies, battery production, battery recycling, battery container and separator production, accessories, assembly equipment) directly employs approximately 31,700 workers. In addition, it supports about 75,000 jobs in other companies supplying into this Industry, and 77,500 jobs from worker spending in different industries.

Beyond jobs, based on 2019 industry activity in 30 countries, the European lead battery industry annually supports 36.5 billion EUR in output or overall economic impact, which includes 14.7 billion EUR in gross domestic product (GDP) – 7.6 billion EUR of which is labour income<sup>75</sup>.

The downstream industry activity enabled through usage of lead batteries is extensive: €7.3 trillion worth of GDP covering retail, construction, and healthcare applications<sup>76</sup>.

Read more about the economic contribution of the European lead battery industry: <https://bit.ly/35h3TfJ>

*Companies to also add own information, where available.*

18. Can you estimate the relative weight of SMEs in the concerned sectors (in terms of number of companies and employment) in your country /in the EU?

According to a study by EBP<sup>77</sup>, 35% of companies in the European lead battery industry (i.e. primary lead manufacturers, mining companies, battery production, battery recycling, battery container and separator production, accessories, assembly equipment,) are medium enterprises and 4% are small enterprises.

*Companies to add available information on proportion of companies that are SMEs in their own supply chains.*

19. Are the manufacturers of the substance or downstream users concentrated in a single/limited number of Member States or in a limited number of regions?

Within the EU, lead metal manufacturers/recyclers are based in 17 Member States: Austria, Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Romania, Slovakia, Spain, Sweden.

Estimated EU27 refinery capacities for lead<sup>78</sup>:

Country	Estimated capacity (tonnes)
Austria	30 000
Belgium	185 000
Bulgaria	130 000
Czech Republic	45 000
Estonia	12 000
France	70 000 <sup>6</sup>

<sup>74</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>75</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>76</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>77</sup> Economic Contribution of the European Lead Battery Industry, EBP, 2021

<sup>78</sup> “World Directory: Primary and Secondary Lead Plants”, ILZSG, 2020

Germany	580 000
Greece	69 000
Hungary	14 000
Italy	260 000
Poland	190 000
Portugal	15 000
Romania	75 000
Slovakia	12 000
Slovenia	35 000
Spain	212 000
Sweden	85 000
<i>Total</i>	<i>2 019 000</i> <small>(footnote 6)</small>

*Companies to specify in which member states they operate.*

EU27 lead-based battery producers, i.e. the main use sector (86%<sup>6</sup> of annual volume) for lead metal, are located in 14 Member States<sup>79</sup>: Austria, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Spain, Slovenia.

*Companies to specify in which member states their lead-using customers (battery and non-battery) operate.*

## COMPETITIVENESS

20. What would be, or has been, the overall cost and time of substitution for the particular use you are providing information on? This includes (if relevant) the need of changes in the production process, need for new product testing, qualification and certification, etc.

*(Pb metal manufacturers are recommended to leave this question blank).*

21. What is the expected impact of substitution costs on the costs of your inputs or final products? What is expected impact on your sales in the EU/outside the EU countries? *(only for companies)*

*(Pb metal manufacturers are recommended to leave this question blank).*

22. Please describe the typical length of the order cycle / investment cycle.
- To the concerned sectors?
  - To your company? *(only for companies)*

*Companies to add information relevant to their supply chain here, if available*

23. Please describe what the impacts of including the substance in Annex XIV of REACH would be? This includes changes in the competitive position with respect to non-EU competitors in the EU market and in third markets.

- To the concerned sectors?

<sup>79</sup> <https://chargethefuture.org/map-of-eu-lead-battery-capacity/>

- d. To your company? (*only for companies*)

*Companies to add own information.*

#### **OTHER IMPACTS OF INCLUSION IN ANNEX XIV** (innovation and business opportunities)

24. If the substance is included in Annex XIV to be eventually phased out, would it create business opportunities (e.g. gaining new markets or higher market share, development of alternative substances / products / production techniques)?
- In your sector? *(recommended to leave this question blank).*
  - For your company? (*only for companies*) *Companies to add own information.*
25. What effects do you expect on enterprises' capacity to innovate? (The capacity to produce more efficiently and/or higher quality and a larger scale of products and services and the capacity to bring R&D to the market)

*Companies to add own information or otherwise leave blank.*

26. Are you aware of any likely effects on recycling or sustainability?

**Lead plays an essential role in the European circular economy of other metals.** The carrier metal properties of lead make it an efficient and effective enabler of high-tech recycling in the EU. The EU's non-ferrous metals recyclers can recover over 20 metals from post-consumer and industrial waste streams, including scrap, catalytic converters, e-waste, and other increasingly complex products at end-of-life<sup>80</sup>. In this way, lead is a key enabler in maintaining the value of materials and resources for as long as possible by returning them into the product cycle at end-of-life, helping to minimise waste.

As shown by the 'metal wheel' in the UNEP (2013) report<sup>81</sup>, the lead value chain is inextricably linked to the production of other valuable and critical raw materials – metals such as zinc, copper, tin, bismuth, indium, gold, silver, and platinum group metals – many of which contribute to future breakthrough technologies for a more sustainable economy. As the EU's ETN Socrates project has also highlighted<sup>82</sup>, lead has a fundamental role of lead in the circular economy and in urban mining, enabling the recovery and recycling of other critical metals and materials from electronics waste and other complex products: *"lead metallurgy is fundamental if the EU wants to retain its leading position in the global circular economy"*.

According to researchers<sup>83</sup>, lead should be seen alongside zinc, copper, nickel and tin as the "Big Five" at the heart of the non-ferrous metals industry. These five metals are the carrier metals in both primary production and recycling for many of the critical and valuable metals needed for today's sustainable technologies. The loss of any of these metallurgies would make the EU circular economy difficult to realize in full, as it would diminish the EU's capacity to recycle complex materials as well as supply

<sup>80</sup> <https://leadmatters.org/circular-economy/> / <https://www.unicore.com/en/about/recycling/>

<sup>81</sup> <https://wedocs.unep.org/handle/20.500.11822/8423>

<sup>82</sup> <https://etn-socrates.eu/socrates-press-release-on-the-importance-of-lead-metallurgy/>

<sup>83</sup> Reuter, Markus, Matuszewicz, Robert, Schaik, Antoinette. (2015). PLENARY LECTURE: Lead, Zinc and their Minor Elements: Enablers of a Circular Economy. World of Metallurgy - ERZMETALL. 68. 132-146.

metals to its industry using its own sources. A healthy circular economy for the EU is built upon the foundation of an advanced metallurgical infrastructure, of which lead metallurgy is a critical component.

The closed loop economy of the EU lead and lead battery value chains provides the raw materials needed locally to make new products, thereby limiting the potential for environmental exposure by keeping lead in the value chain and out of Europe's waste stream, indefinitely. For example, every year, more than 100 million used lead batteries are kept out of the EU's waste stream by a value chain embracing circular economy principles and operating in a fully closed loop<sup>84</sup>.

The EU has some of the world's most advanced and efficient non-ferrous metals production sites – many of which are lead battery recyclers – creating value, skills and 'green' jobs. With a quarter of the world's recycled metals already generated in Europe<sup>85</sup>, lead metallurgy can ensure Europe's continued global leadership role in the circular economy: the loss of lead metallurgy would remove a central process for Europe's multi-metallic recycling industry, making it less efficient and less competitive, and could therefore threaten the EU's position as a global leader in recycling.

27. In your opinion, if the substance is included in Annex XIV to be eventually phased out, would the economy, society or the environment be better or worse off (all factors considered)? Why?

*Companies to add own views, or leave blank.*

#### **APPLICATION FOR AUTHORISATION** (*only for industry actors*)

28. If the substance is included in Annex XIV, would you consider applying for an authorisation? Are you aware if your suppliers/downstream users would consider to apply?

*Companies to add own information – but please first note the template comments under Qu 29*

29. How would you envisage that the submission of an application for authorisation could be organised, considering your specific uses and the structure of the supply chain: would you envisage an application by manufactures/importers of the substance or formulators (upstream the supply chain)/ or applications by downstream users or a combination of all)?

How the lead-using industries would coordinate its Applications for Authorisation, in the event that Pb metal were included in REACH Annex XIV, has not yet been determined. However it is envisaged that, in general, users would submit Applications for Authorisation for their own uses, which could result in many hundreds of Applications for Authorisation being submitted if there were no exemptions granted.

Industry experience in other sectors has shown that the feasibility of upstream Applications for Authorisation is often limited. For example, the necessarily detailed information on why potential alternatives are not feasible, on precise exposure and emissions during the use, on potential timelines for substitution by the users, and other information necessary for a robust Application for Authorisation, is normally only available within the downstream or end use sector and not to the substance manufacturer.

---

<sup>84</sup> <https://chargethefuture.org/#:~:text=on%20Europe's%20roads,-,SUSTAINABLE>

<sup>85</sup> <https://www.eurometaux.eu/media/2005/full-report-8-56-17.pdf>

Downstream users may also prefer, from a strategic business perspective, to make their own application instead of relying on the Application for Authorisation submitted by an upstream supplier.

30. What main challenges in preparing an application do you expect for your specific case? Would you envisage applying for your own uses or would you apply to cover uses of your downstream users? Would you apply jointly with other downstream users covering the same use?

*Companies to add own information – but please first note the template comments under Qu 29*

#### **REGULATORY OPTIONS**

31. Do you consider that other regulatory options could better address the concerns for human health or the environment for which the substance is recommended for inclusion in Annex XIV? What are these regulatory options and why would they better address the concerns?

Yes. The EU already has a very comprehensive framework of lead-specific legislation designed to manage risk. Importantly, key aspects of the EU's regulatory framework designed to minimise and reduce lead exposures are already being reviewed to ensure an even higher level of protection of human health and the environment. In particular, the EU's binding occupational exposure limits are currently being revised by DG Employment to further protect all workers potentially exposed to lead and lead compounds at work, not just those manufacturing and using lead, and the IED is being reviewed – the IED regulates pollutant emissions, including lead, from all relevant industrial installations, not just lead manufacturing and use.

In the context of general population exposure to lead via the environment, it would be more effective to strengthen legislative controls on industrial activities which contribute most to the air and water emissions. As noted above, according to recent E-PRTR data<sup>86</sup>, across the EU-27 there was an 88% reduction in lead emissions to air and an 80% reduction in lead emissions to water between 2007-2020. According to Industry's further analysis of the data<sup>87</sup>, the majority of remaining lead emissions in the EU now result from activities which are NOT in scope of REACH Authorisation for lead metal, i.e. thermal power stations, iron and steel, and waste management. As such we support the Commission's activities underway to review and revise long standing EU legislation, including the IED, to make it better fit climate change objectives, circular economy and the chemical strategy for sustainability, considering the key sources of lead emissions to the environment.

Should COM still feel it appropriate to include lead metal in REACH Annex XIV, then we believe that its industrial use in specific applications, particularly the production of lead-based batteries and the uses exempted under the ELV and RoHS Directives, meets ALL requirements of REACH Article 58(2) in that the existing Community legislation already addresses the use categories to be exempted, exemptions which are time-limited and are already subject to periodic review by the Commission.

Subjecting these uses additionally to REACH Authorisation would be a clear example of double regulation.

#### **OTHER REMARKS**

---

<sup>86</sup> <https://industry.eea.europa.eu/analyse/pollutant>

<sup>87</sup> PB EMISSION INVENTORY FOR THE ENVIRONMENT, Final report prepared for the Lead REACH Consortium, 22nd October 2021, Arche Consulting Ltd (not published)

32. Would you like to provide additional comments/information on the possible socio-economic impacts?

Inclusion of lead metal in REACH Annex XIV would impede the efficient delivery of EU policy objectives for a strategically autonomous, sustainable and carbon-neutral future.

Inclusion in REACH Annex XIV is not a proportionate nor effective measure given the extensive regulatory framework already in place and for the additional reasons discussed below:

*Proportionality and effectiveness*

***Subjecting lead metal to REACH Authorisation will not reduce exposure or emissions significantly or in a proportionate way.***

Using the REACH Authorisation process to regulate lead metal is not a proportionate regulatory action considering 86%<sup>88,6</sup> of the EU volume is used industrially to produce lead-based batteries. Existing legislation already drives substitution and in particular provides time-limited exemptions in the case of automotive batteries. Moreover, under the proposed EU Battery Regulation it is already foreseen that if there is an unacceptable risk to human health or the environment arising from use of a substance in the manufacture of batteries or during subsequent life cycle stages, the Commission shall adopt a restriction. Therefore it is clear that existing and currently-proposed EU legislation already addresses risks, and where appropriate drives substitution, associated with battery production that uses the majority of lead placed on the EU market.

A recent study<sup>89</sup> concluded that – despite the sector using approximately 86%<sup>6</sup> of the total EU use volume per year – the lead battery value chain contributes just 2.2% of the total Pb emissions to air and 0.02% total Pb emissions to water.

The study<sup>90</sup> also compared anthropogenic emissions with emissions via natural processes, concluding that:

- emissions to water via natural processes are 8 times higher than the total from anthropogenic sources (16,140 vs 2,007 tonnes per year),
- emissions to soil via natural processes are 1.7 times higher than the total from anthropogenic sources once ammunition (which is undergoing a REACH Restriction at the time of writing (February 2022) is excluded (723 vs 434 tonnes per year).

Another recent study<sup>91</sup>, which considered recent and historical data on lead isotopic composition in airborne particles in London, showed strong evidence that Pb sources have not changed substantially since the ban in 1999 of leaded gasoline, suggesting that historical gasoline-derived lead remains an important source of lead in today's urban environment due to its persistence and effective remobilisation.

---

<sup>88</sup> ILA, 2021 (“First Uses of Lead Metal in the EU”)

<sup>89</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

<sup>90</sup> De Brouwere, K., Verdonck, F., Geerts, L. et al. Assessment of human exposure to environmental sources of lead arising from the lead battery manufacturing and recycling sector in Europe: demonstration of a tiered approach in a case study. *J Expo Sci Environ Epidemiol* (2021). <https://doi.org/10.1038/s41370-021-00395-5>

<sup>91</sup> Strong evidence for the continued contribution of lead deposited during the 20th century to the atmospheric environment in London of today

Eléonore Resongles, Volker Dietze, David C. Green, Roy M. Harrison, Raquel Ochoa-Gonzalez, Anja H. Tremper, Dominik J. Weiss. *Proceedings of the National Academy of Sciences* Jun 2021, 118 (26) e2102791118; DOI: 10.1073/pnas.2102791118

The paper suggests that atmospheric lead has now reached a baseline that would be difficult to decrease further, even with additional policy measures (such as REACH Authorisation) targeting ongoing use of Pb substances.

Subjecting the main (86%<sup>6</sup>) use sector (i.e. lead battery production), and almost every other use of lead, to REACH Authorisation in order to address any limited and specific concerns would be disproportionate and would not result in substantive reductions in emissions or exposure – considering especially that 65% of yearly lead emissions to air in the EU come from thermal power stations, pig iron & steel production, and waste management – activities which are not in scope of REACH Authorisation of lead metal.

Including lead metal in REACH Annex XIV would also not encourage substitution more quickly, as the ELV and RoHS Directives, for example, already require substitution where there is a technically feasible alternative – the ELV exemptions scheme and its review process, for example, do not take into consideration socio-economic feasibility of any potential alternatives, only technical feasibility. Therefore the existing lead-specific exemptions review/renewal processes would be more likely to enforce substitution earlier than REACH Authorisation, if a technically feasible alternative were to become available.

#### Workload considerations

Including lead metal in REACH Annex XIV would add additional burden on regulators who would have to assess many **hundreds of Applications for Authorisation**, including from lead battery producers, producers and users of leaded steels, lead-containing brasses and bronzes, and lead-containing aluminium alloys, and producers of electronic and electrical goods – the majority of whom would have to apply to continue uses that are already exempted from the regulatory bans on lead under the ELV and RoHS Directives.

#### Competitiveness

REACH Authorisation does not apply to the import or use of articles. The inclusion of lead in Annex XIV would place a requirement – a regulatory burden and additional cost – on our customers in the EU who use lead to produce articles, cost and burden which would not apply to non-EU article producers. EU article producers using lead would become less competitive than their non-EU equivalents, and the balance of EU exports and imports of articles made with lead could shift substantially if the import of articles into the EU were in essence encouraged because of REACH Authorisation requirements for EU lead usage.

Inclusion in REACH Annex XIV would signal to businesses and investors that the EU intends to phase out lead, which could trigger premature and significant market changes and make the EU overall less competitive than non-EU counterparts.

#### Demand and disposal

Some minor uses of Pb metal, e.g. intermediate uses, uses of articles, would be out of scope of the Authorisation requirement. However, if Pb metal were to be included in Annex XIV *without exemptions or Authorisation being granted*, the EU demand for lead metal would be decreased substantially.

A significant reduction in demand would mean that the recycling of lead batteries and other lead-containing materials at end-of-life would be less commercially viable – and that the recovered lead would no longer have significant value from use in the EU. As noted above, more than 100 million used lead

batteries are kept out of the EU's waste stream every year by a value chain embracing circular economy principles and operating in a fully closed loop<sup>92</sup>. But without EU demand for lead, the 1.2+ million tonnes<sup>93</sup> of lead being recycled every year in the EU would instead need to be discarded, somehow, as hazardous waste, or even exported to non-EU countries for battery production – it would no longer be kept in the EU value chain which is already an activity that minimises waste and exposure and emissions.

This significant reduction in lead demand would also impact the EU economy: currently, approximately €2 billion worth of lead from recycled sources is used per year for EU lead battery production.

### **Annex I: Key EU legislation dealing with ambient air, water, drinking water, waste, and food, in the context of lead emissions to / levels in the environment and food chain**

- The **Industrial Emissions Directive** 2010/75/EC (as amended)
- Council Directive 2008/50/EC (as amended) on **ambient air quality** and cleaner air for Europe
- Council Directive 2000/60/EC (as amended) establishing a framework for Community action in the field of **water policy** (Water Framework Directive)
- Council Directive 98/83/EC (as amended) on the **quality of water intended for human consumption**
- Council Directive 2006/118/EC (as amended) on the **protection of groundwater** against pollution and deterioration
- Council Directive 86/278/EEC (as amended) on the **protection of the environment, and in particular soil**, when sewage sludge is used in agriculture (**Sewage Sludge Directive**)
- Directive 2005/31/EC amending Directive 84/500/EEC in regards **ceramic articles intended to come into contact with foodstuffs**
- Commission Regulation (EC) 1881/2006 (as amended) setting **maximum levels** for certain contaminants **in foodstuffs**
- Regulation (EC) No 1334/2008 on **flavourings for use in foodstuffs**
- Directive 2009/32/EC on **extraction solvents in foodstuffs**
- Regulation No 1881/2006 (as amended) as regards **food contamination** (maximum levels)
- Commission Directive 2002/32/EC (as amended) on **undesirable substances in animal feed**
- Regulation (EU) 1275/2013 amending Annex I to Directive 2002/32/EC as regards maximum levels in **animal feed**
- Council Directive 2008/103/EC amending Directive 2006/66/EC on **batteries and accumulators** and waste batteries and accumulators
  - *NB Batteries Regulation proposal currently under scrutiny*
- Council Regulation 1013/2006 (as amended) on **shipments of waste**
  - *NB currently under review*
- Directive 2008/98/EC (as amended) on **hazardous waste**
- Directive 2012/19/EU on **waste electrical and electronic equipment**
- Directive 94/62/EC (as amended) on **packaging and packaging waste**

---

<sup>92</sup> <https://chargethefuture.org/#:~:text=on%20Europe's%20roads.-,SUSTAINABLE>

<sup>93</sup> Data for 2020 as submitted by ILZSG in 2021 to ongoing EM Green Deal Resources study (not published)

## Attachment 2: ILA paper: First Uses of Lead Metal in the EU, ILA, 2021

### Background:

To help RAC with the Article 77 (3)(c) request for classification and labelling of lead for aquatic hazards, the European Chemical Agency RAC Committee has requested additional information of the first uses of lead metal in the EU. At the RAC-57 WG meeting that took place on 27<sup>th</sup>-28<sup>th</sup> April 2021, Industry reported that approximately 84% of the total volume of lead metal is used by the EU battery manufacturing industry to manufacture automotive and industrial lead batteries. The rolling of lead ingots to produce lead sheets represented in 2017 approximately 3% of the total volume. RAC therefore requested further information on the "unaccounted" 13% of total volume to better ascertain whether the reasonable handling and use of lead metal in massive form for these applications could result in the production of amounts of lead particles <1mm.

### Information on First Use of Lead Metal in the EU

The latest figures available to the International Lead Association relate to production and use of lead metal in 2018. In this year approximately 1,500,000 tonnes of refined lead metal were produced (and used). This compares to a total global refined lead use of nearly 12,000,000 tonnes. In Europe, approximately 80% of the refined lead metal production is from recycled lead containing materials (mainly end-of life batteries).

As lead battery use dominates the sector there has been little effort made recently to undertake a mass balance to identify trivial uses. However, the International Lead Zinc Study Group (ILZSG), set up by the United Nations in 1959 to ensure transparency in the markets for lead and zinc worldwide, commissioned a Study by Oakdene Hollins in 2017 to identify the first uses of lead metal in the EU during the period 2005-2015. It concluded that uses of lead metal in all applications, except battery manufacturing, had reduced significantly over the ten-year period and by 2015 the approximate relative contributions of the known uses were as described in Figure 1.

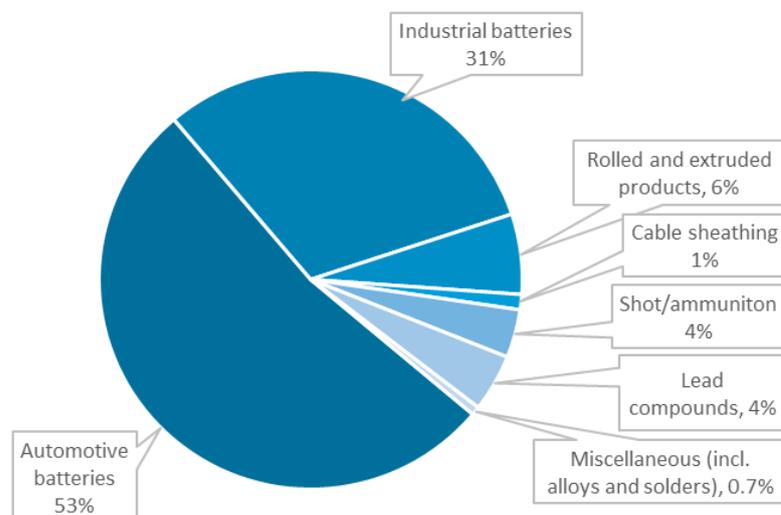
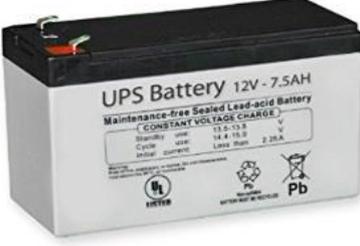


Figure 1: reported first uses of lead metal in the EU in 2015

Use		Notes	Tonnes (ILZSG 2015 estimate)	Tonnes (ILA 2021 estimate)	Production
Automotive batteries			809,000	809,000	Lead metal used to manufacture battery plates/ grids, pots (casting) and compounds used for paste
Industrial batteries			460,000	460,000	Lead metal used to manufacture battery plates/ grids, pots (casting) and compounds used for paste
Rolled and extruded products		Lead sheet accounts for most of the lead used in this category with other uses including wires, tubes, weights foils, wools and specialist scientific equipment, representing approx. 5%	95,000	50,000 (there has been a rapid decline in the main application of lead sheets for use in buildings due to market substitution)	Produced by rolling, casting or extruding process from lead ingots
Shot and ammunition		The hardness of lead shot is controlled through adding variable amounts of other metals including tin and antimony, forming alloys.	57,000	57,000	Lead shots produced by melting lead ingots and passing down a shot towers where lead solidifies into spheres >1mm.

Cable sheathing	<p><b>Lead Sheathed Cables</b></p> 		18,000	20,000	Lead ingots extruded to produce coverings for undersea cables
Lead compound manufacture			68,000	20,000 (there has been a rapid decline in use of lead compounds due to substitution and restrictions in lead-based stabilisers that were the main market)	Starting point is 99.985 % purity lead metal in ingots that will be melted in an agitated reactor and oxidised in an air atmosphere to form lead oxides. Lead oxides then undergo further chemical reactions to form other lead-based chemicals.
Alloys (including solders)		The principal use of lead as an alloying metal is in solders. This has significantly declined due to legislative controls.	10,000	5,000	Lead shot is used for alloying additions to brass, aluminium and other alloys. Lead is used to improve machinability, allowing higher cutting speeds and longer tool life. Potential to form particles of alloy (not lead) in machine shops finishing articles manufactured with the alloy.

According to ILA's estimates, lead battery manufacturing in the EU is now expected to represent approx. 90% of the EU use of lead metal given significant declines in other markets such as architectural lead sheet, lead stabilizer and solder use due to combination of market substitution and regulation.



Apart from the cutting of lead sheet products and machining of articles made from alloys containing lead, that will both produce swarf's, we cannot identify any other uses of lead metal that would directly result in the production of lead particles <1mm.

**International Lead Association, May-2021**

## **Annex 2: ILA member companies**

<https://ila-lead.org/new-members/>

### **Full Members**

APSM	Exide Technologies SLU	Aurubis Beerse nv
Aurubis AG	Glencore	Moura
Berzelius Metall	Gopher Resource	MPI Recyklaza
BMG Metall & Recycling	Gravita (Jaipur, India)	MR Umwelttechnik GmbH
Boliden AB	Gravita (Chittoor, India)	Orzel Bialy
BSB Recycling	Hakurnas Lead Works Ltd	RSR North America
Campine Recycling	Hecla Mining	South32
Clarios (Europe)	Jiangsu New Chunxing Resource Recycling Co., Ltd.	STCM
The Doe Run Company	KCM SA	Systems Sunlight
East Penn Manufacturing	KGHM	Teck
Ecobat	Korea Zinc	Terrapure Environmental
Envirowales	Kovohute Pribram	
Exide Technologies Recycling II, Lda	Lundin Mining	

### **Associate Members**

Association of European Manufacturers of Sporting Ammunition (AFEMS)	Calder Industrial Materials	Interstate Batteries
Batteriretur	Coplosa SA	Midland Lead
Boab Metals Limited	EnerSys	PENOX GmbH
	Engitec Technologies SpA	Traxys
	H. Folke Sandelin AB	W L Gore and Associates

### Annex 3: Pb REACH Consortium member companies

<https://ila-reach.org/the-consortium/members/>

#### Full Members

5N Plus	Clarios Zwickau GmbH & Co KG	Exide Technologies SA (Centra)
Akdeniz Chemson	Colorobbia Italia spa	Exide Technologies SA (Tudor)
Akkumulatorenfabrik Moll GmbH	COPLOSA, Sociedad Anonima	Exide Technologies SAS (CEAC)
Anton Schneider Sohne GmbH	Derichebourg España SAU	Exide Technologies Srl (Exide Italia)
Asua Products SA	ECOBAT Resources Braubach GmbH	Fenix Metals Sp. z o.o.
Aurubis AG	ECOBAT Resources Estrées Saint Denis	FIAMM Energy Technology S.p.A
Aurubis Beerse nv	ECOBAT Resources Freiberg GmbH	Glencore Import BV
Azor Ambiental SA	ECOBAT Resources Stolberg GmbH	Glencore International Import BV
BAE Batterien GmbH	ECOBAT srl	GS Yuasa Battery Manufacturing UK Ltd
Baerlocher GmbH	Ecometal Ltd	Hammond Lead Products
Banner GmbH	EnerSys Newport	Hakurnas
BASF SE	EnerSys SARL	H J Enthoven Ltd
BMG Metall und Recycling GmbH	EnerSys Sp. zoo	Hoppecke Batterien GmbH & Co KG
Boliden Bergsoe AB	EnviroWales	Huta Cynku “Miasteczko Slaskie”
Boliden Mineral	Exide Technologies GmbH (Deutsche Exide)	IKA Innovative Kunststoffaufbereitung GmbH
Britannia Refined Metals	Exide Technologies Lda (SPAT)	Jenox Akumulatory Sp. z o.o.
Campine Recycling NV	Exide Technologies Recycling SL (Oxivolt)	KCM 2000 SA
Clarios Ceska Lipa spol. S.r.o	Exide Technologies Recycling II Lda (Sonalur)	KGHM Polska Miedz SA
Clarios Iberia P&D S.L.		
Clarios Recycling GmbH		
Clarios VARTA Hannover GmbH		

Kovohute Pribram Nastupnicka  
a.s

Metalblanc

Metal Processors Limited

Metalurgica de Medina SA

Midac S.p.A.

ML Operations Ltd

Monbat Recycling EAD

MPI Recyklaza d.o.o

NEW MECA S.r.l.

Nordenham Metall GmbH

Penox GmbH

Piombifera Italiana S.p.a.

Piomboghe Srl

Portovesme Srl

PPUH Autopart Jacek BAK Sp  
z o.o

SC Rombat SA

SIA Industria Accumulatori  
Spa *in liquidation*

S.I.A.P. Sp. z.o.o

STCM-APSM

Systems Sunlight SA

TAB dd

Teck Resources Ltd

Traxys Europe SA

Umicore

Uzimet

Vellonton Ltd

Vipiemme SpA

Wilhelm Grillo  
Handelsgesellschaft mbH

Zap Sznajder Batterien s.a

ZM Silesia SA – Grupa  
Impexmetal

### **Associate Members**

Association of European Manufacturers of Sporting Ammunition (AFEMS)