



European
Automobile
Manufacturers
Association



ACEA, JAMA, KAMA, EUROBAT and ILA Position on Lead-based batteries and Exemption 5 of the EU End of Vehicle Life Directive

Lead-based batteries remain essential for the needs of all current and future generations of European cars. The EU must continue to allow the use of lead-based batteries and the minimum time till the next review should be five years.

EU Directive 2000/53/EC on end-of-life-vehicles restricts the use of certain substances in vehicles, but exempts certain uses (Annex II). These exemptions are subject to regular reviews according to technical and scientific progress. Lead-based batteries in automotive applications have an exemption. After being granted an exemption for five years in 2010, lead batteries are now subject to review for a second time.

The industry group representing the car manufacturers of Europe (ACEA), Japan (JAMA) and South Korea (KAMA), the European battery industry (EUROBAT) and the International Lead Association (ILA), together with the US automotive and battery industries, jointly support the underlying principles and objectives of the EU End of Vehicle Life Directive (2000/53/EC). Together, they take this opportunity to comment on the European Commission's proposal for the 8th Amendment to Annex II of the End of Life Vehicle Directive. This industry group does not only represent the whole supply chain for lead batteries, but also end users and manufactures of other battery technologies.

The group would like to make the following comments regarding the proposed European Commission's amendment:

- **The automotive and battery industries welcome the Oeko Institute's conclusion¹ that alternative battery technologies cannot yet be used as a mass market alternative to lead-based starter batteries and the proposed amendment of the European Commission that will extend the Exemption 5 in Annex II of the ELV Directive. We consider that this conclusion addresses the needs of the automobile industry for safe, reliable and proven mass-market battery technology for starter-lighting-ignition (SLI) and start-stop hybrid applications.**

¹ 8th Adaptation to scientific and technical progress of exemptions 2(c), 3 and 5 of Annex II to Directive 2000/53/EC (ELV) - Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020 – Final Report, 17 February 2016

- We note the Oeko Institute report recognises the ongoing industry R&D initiatives to find replacements for lead-based batteries and the need to ensure that any alternative requires extensive testing, development and approval before it could be considered suitable for mass market applications. For that reason, we originally requested an eight year review period and contend that a five year period is the absolute minimum time necessary to gain sufficient experience in terms of developing and testing alternative battery applicability.
- Lead-based batteries are currently the only automotive battery technology that operates in a closed loop in Europe, with more than 99% being collected and recycled when they come to the end of their useful life for further use in lead batteries, making a vital contribution to the European circular economy. We therefore believe that future decision-making should consider a wider life cycle assessment of the environmental impacts of the potential replacement of lead-based batteries with alternative technologies.
- Drop-in solutions for alternative 12V battery technologies are currently not available for mass production vehicles without significant and expensive re-design, where cranking-time and energy management as well as discharge characteristics and package location would have to be considered.
- Lead battery technology has been on the market for decades and platform design has evolved around this technology. As vehicle and electrical architecture and design standards are closely linked to lead battery functionality, adoption of a new single-battery technology would challenge the current state of the art and in itself require significant innovation in platform design.

In addition to the technical and scientific arguments made above, we strongly feel that socio-economic impacts should be taken into consideration by decision-makers when assessing whether, and for how long, to extend the exemption for lead-based batteries. Europe has a long-established and globally competitive lead-based automotive battery manufacturing industry, which supplies the majority of original equipment (OE) and aftermarket (AM) customers in Europe. As a result, the production of automotive lead-based batteries has led to the creation of a significant number of jobs in battery manufacturing in Europe as such, but also in the up- and downstream sectors.

ADDITIONAL INFORMATION

The importance of lead-based automotive batteries

Lead-based batteries are vital for the following applications in vehicle types:

1. **Starter-lighting-ignition (SLI) battery:** these 12V batteries are required to start the engine and supply the complete electrical system (starter-lighting-ignition).
2. **On-board supply battery:** in addition to a traction battery used to propel a vehicle (usually Li-based), plug-in hybrid electric and full electric vehicles require a separate lead battery for functional safety, controls, comfort features and redundancy.

It should be noted that the information below is not relevant to high voltage batteries for use in electric-vehicles and full hybrid vehicles. The batteries used in these vehicles have different functionalities and requirements.

Start-stop and hybrid applications: advanced lead batteries are used in micro hybrid vehicles utilising start-stop technology, thereby leading to significant CO₂ savings. Lead batteries may also be used in the future for hybrid applications increasing the potential CO₂ savings further.

Lead batteries stand out from other battery technologies and have a number of key automotive features:

- **Safety** is essential to OEMs and to their customers, and should be considered at both the component and vehicle level, in addition to service and end-of-life aspects. Lead batteries are a well-understood system with an aqueous electrolyte that is inherently safe, making battery fires and explosions an extremely rare event. Lithium-ion (Li-ion) batteries need carefully designed systems to ensure safe operation. The high energy density of these batteries, coupled with the use of flammable organic solvent electrolytes and the use of thin electrodes and separators make battery integrity more challenging.
- **Vehicle design:** lead battery technology has been on the market for decades and platform design has evolved around this technology. As vehicle and electrical architecture and design standards are closely linked to lead battery functionality, adoption of a new single-battery technology would challenge the current state of the art and in itself require a significant innovation in platform design. Lead-based batteries are intrinsically safe and as a consequence can be located in all positions in a vehicle.
- **Winter performance:** Cold cranking is required as part of OEM vehicle specifications to ensure reliable vehicle operation in very cold weather conditions, eg -30°C or up to -40°C in Northern Countries with a polar climate. The unrivalled cold cranking properties of lead-based batteries and the robust re-chargeability are key reasons that make this battery type essential and currently irreplaceable for mass market vehicles. At low temperatures no other commercially available battery system for volume production is able to meet the required performance demanded.
- **Durability at high temperatures:** the temperature of a battery within the vehicle architecture is a key parameter for the safety and the life time of the battery. Lead-based batteries can withstand internal temperatures, which cover all realistic scenarios. For example under the bonnet ambient temperatures in hot climates. In comparison, the general operating temperature range for a Li-ion battery is significantly lower. For higher temperatures (as mentioned above for lead-based batteries) additional cooling systems would be required.
- **Sustainable recycling** virtually all lead batteries are collected and recycled through a very efficient infrastructure that is driven by the economic value of the battery. In Europe, more than 99% of lead-based batteries are collected and recycled and a lead-based battery comprises for approximately 85% of recycled material. These characteristics are not currently met by alternative battery technologies.
- **Low combined cost:** at present, lead-based batteries remain by far the most cost-effective and durable battery technology for SLI applications in conventional powertrains (in the region of €50-150 per kWh). On a battery level, it was reported during the consultation period that lead batteries cost €30-80 per battery; in contrast the cost is €300-500 per Li-ion SLI battery. This cost differential is prohibitive except in the case of luxury vehicles where cost is not a major issue. In addition to the lower cell-level cost, lead batteries do not require heat shielding, active cooling, or a sophisticated battery management system. This is an important consideration for consumers and the automotive industry,

due to the higher financial burdens of a more expensive alternative battery system. This combination of cost and performance makes lead batteries the most cost efficient option for CO₂ reduction in automotive applications.

Socio-economic considerations

Of the 253 million passenger cars on European streets 99.99 % are using lead-based batteries. The few vehicles using a single Li-ion battery are mainly high performance sport cars.

The lead battery industry is vital to the European economy; it directly employs around 20,000 workers in Europe and has an annual turnover of approximately €5 billion. Users of lead-based batteries include the automotive industry which, directly and indirectly, employs 12.2 million people - representing 5.6% of total EU employment.

Lead battery manufacturers and associated suppliers are located in virtually all EU countries. On the other hand, there is no significant Li-ion cell production taking place in the EU, with the vast majority of production occurring outside Europe.

Closed loop recycling of lead-based batteries is managed by collection and recycling companies located in many member states that operate under strict environmental permits. These companies employ approximately 2,500 workers and the lead they recycle has a market value of approximately €2 billion.

About the industry group

EUROBAT is the association for the European manufacturers automotive, industrial and energy storage batteries. EUROBAT has 52 members from across the continent comprising more than 90% of the battery industry in Europe. The members and staff work with all stakeholders, such as battery users, governmental organisations and media, to develop new battery solutions in areas of hybrid and electro-mobility as well as grid flexibility, renewable energy storage and demand response services www.eurobat.org.

The European Automobile Manufacturers' Association (ACEA) represents the 15 Europe-based car, van, truck and bus manufacturers: BMW Group, DAF Trucks, Daimler, Fiat Chrysler Automobiles, Ford of Europe, Hyundai Motor Europe, Iveco, Jaguar Land Rover, Opel Group, PSA Group, Renault Group, Toyota Motor Europe, Volkswagen Group, Volvo Cars, Volvo Group. More information can be found on <http://www.acea.be> or [@ACEA_eu](https://twitter.com/ACEA_eu).

Japan Automobile Manufacturers Association (JAMA) JAMA is a non-profit industry association which comprises Japan's fourteen manufacturers of passenger cars, trucks, buses and motorcycles. JAMA works to support the sound development of Japan's automobile industry and to contribute to social and economic welfare.

Korea Automobile Manufacturers Association (KAMA) KAMA is a non-profit organization, representing the interests of automakers in Korea. KAMA is also dedicated to the sound growth of the automobile industry and the development of the national economy.

International Lead Association (ILA) The ILA is a membership body that supports companies involved in the mining, smelting, refining and recycling of lead. The ILA represents the producers of about 3 million tons of lead. ILA's work has a broad focus, covering all aspects of the industry's safe production, use and recycling of lead and supports the work of the Advanced Lead Acid Battery Consortium.