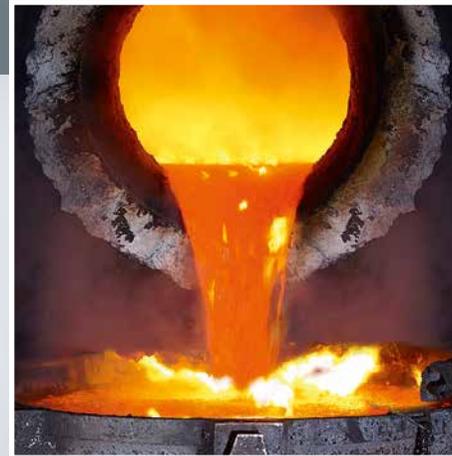
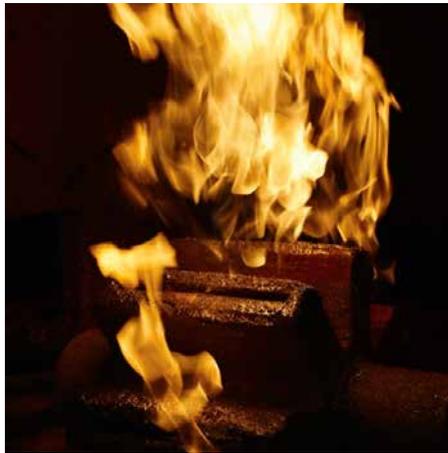


SUSTAINABLE BATTERY-RECYCLING.  
WE CLOSE THE LOOP.



**BERZELIUS**  
M E T A L L

# SHAPING PERSPECTIVES



The Braubach-based BERZELIUS Metall GmbH (BMB) is a foremost producer of lead and its alloys as well as polypropylene compounds. Using its own logistics company for battery recycling, coupled with an incinerator plant for hazardous wastes, BMB is an outstanding example of a company smelting lead and using an exemplary closed-circuit recycling system to re-utilise scrap and recover other products.

Three state-of-the-art primary and secondary lead smelters – the primary lead smelter of BERZELIUS Stolberg GmbH (BBH), and the secondary lead smelters of BSB Recycling GmbH and MRU, the Muldenhütten Recycling and Umwelttechnik GmbH – combine in advancing BMB, a subsidiary of Eco-Bat Technologies Ltd., to the foremost German producer of lead.

At the three companies located in Braubach, Freiberg and Stolberg, about 400 employees produce around 255,000 tonnes lead annually.



Lead is essential for numerous key industries. The electrochemical properties of this “heavyweight” among metals, make lead most suitable for storing energy.

About 60 per cent of the globally produced lead is thus used for car batteries and accumulators for supplying energy. Its high density also makes it an ideal choice for shielding materials, e.g., in the X-ray technology. The high resistance to corrosion makes lead suitable as a construction material for installations, as a reliable sheathing material for cables, for thermal insulations and as a soundproofing material in the building and construction industry.

Lead also plays an important role in, for example, the automotive industry, where it is used to dampen vibrations.

# TECHNOLOGY/KNOW HOW

## PRIMARY LEAD SMELTER

BBH Stolberg, the largest producer of primary lead in Germany, uses the environment-friendly and energy-saving QSL technology for smelting. This entails winning lead from lead ores and secondary raw materials in a single, encapsulated aggregate, the QSL reactor. The production technology used here is universally acclaimed as being the most modern, most environment-friendly and most efficient of its kind. BBH Stolberg produces a high grade, high-purity lead with the brand name "STOLBERG", more than 100 different lead alloys made according to customer specifications, sulphuric acid, silver, copper/lead matte as well as BERZELIT® slag.

With the 2009 inaugurated Bayqik system to reduce the input concentration of sulfuric acid and an optimized process management, revenue is significantly increased and emissions are reduced to a minimum. By that jointly with Bayer Technology Services developed process a daily capacity of 450 tonnes of sulfuric acid is achieved.



## SECONDARY LEAD SMELTER

The secondary lead smelters of BSB Braubach and MRU Freiberg process used accumulators, industrial scrap containing lead and tin, as well as production returns. The multi-stage Engitec process employed represents a state-of-the-art technology, which ensures a separation into unadulterated components consisting of lead paste, sulphuric acid, plastics and grid metals. During the following smelting stage, the separated lead grids, desulphurised lead paste, lead scrap and lead-containing residues are reduced to lead bullion in short rotary furnaces.

In addition to lead and its alloys, the secondary lead smelters of the BMB Group also produce polypropylene chips (PP) and sodium sulphate. The treated PP chips and other used plastic parts are processed to high-grade PP compounds having the trade name Seculene®, a material which is in no way inferior to polypropylene produced from primary raw materials.

The MRU Freiberg also jointly operates an environment-friendly incinerator plant for hazardous wastes.

# PRODUCTS & FIELDS OF APPLICATION



## LEADING IN CUSTOMER SOLUTIONS

BERZELIUS Metall, a technology and service oriented enterprise, develops innovative processes and materials for its customers. The primary lead "STOLBERG" and the listed brands "F" and "BSB" are characteristic for the core business of BERZELIUS Metall. More than 100 lead alloys conforming to international standards and made according to customer specifications, antimony master alloys,

doré silver, polypropylene compounds trade named Seculene®, copper, sulphuric acid and sodium sulphate are part of the range of high-grade products.

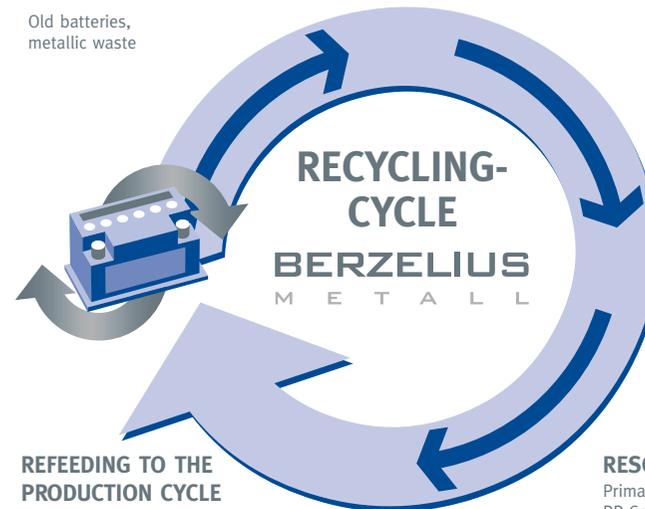
Products which precisely fulfil demanding customer stipulations, are hallmarks of the BMB subsidiaries, emphasising their leadership in key markets. Customers for lead are spread across industries manufacturing batteries, optical devices, chemicals, solar industry and chemical plant constructions as well as in those cases where a protection against radiation is required. The automotive industry avails of the competence of the plastics recycling group, utilising the polypropylene compounds Seculene® to manufacture high-quality plastic components for external uses in cars.

### COLLECTION, TRANSPORT AND STORAGE

Old batteries, metallic waste



### RECYCLING-PROCESS AND ENERGY RECOVERY



### REFEEDING TO THE PRODUCTION CYCLE

Lead Battery industry, chemical industry, electrical industry, automotive industry

### RESOURCE PRODUCTION

Primary-/Refined lead, lead-alloys, PP-Compounds, sulphuric acid, sodium sulphate

# THE CLOSED RECYCLING LOOP

## PARTNERS AT EVERY STAGE

Since lead can be recycled without any loss in quality, more than half the lead in circulation worldwide is derived from recycled material. The largest customers for lead are the manufacturers of accumulators for vehicles and other industrial purposes. Consequently, disposed batteries constitute the main starting material for the environment-friendly and resource-saving recovery and re-utilisation of this recyclable metal. BERZELIUS Metall, together with its subsidiaries, covers every stage of lead recycling fully and competently.



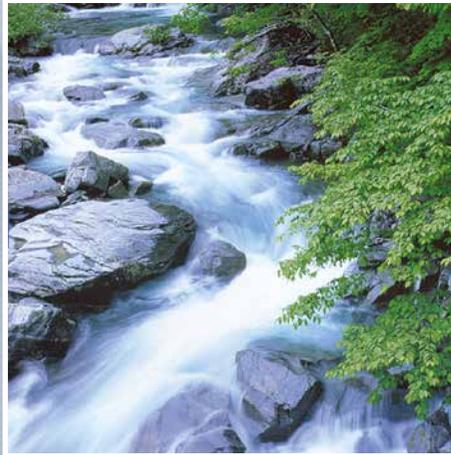
The Braubach based logistics company for battery recycling with sites in Regenstauf, Freiberg, Kornwestheim and Gelsenkirchen ensures with an own vehicle fleet the professional collection and delivery of used batteries to the secondary smelters, where these are sorted into the different pure components for further treatment.

Recyclable plastics are first processed to polypropylene chips and then in a following step to high-grade compounds for the automotive industry. Plastics, which cannot be recycled, are burnt off in the group's own incinerator for hazardous wastes.

Lead-containing materials are reduced and refined in Stolberg, Braubach and Freiberg to lead, its alloys and to other desired raw materials.

The lead is used for making new batteries, which, once their life cycle ends, are fed back to the recycling process. Lead from the other applications stated above is also fed back as scrap to the recycling process.

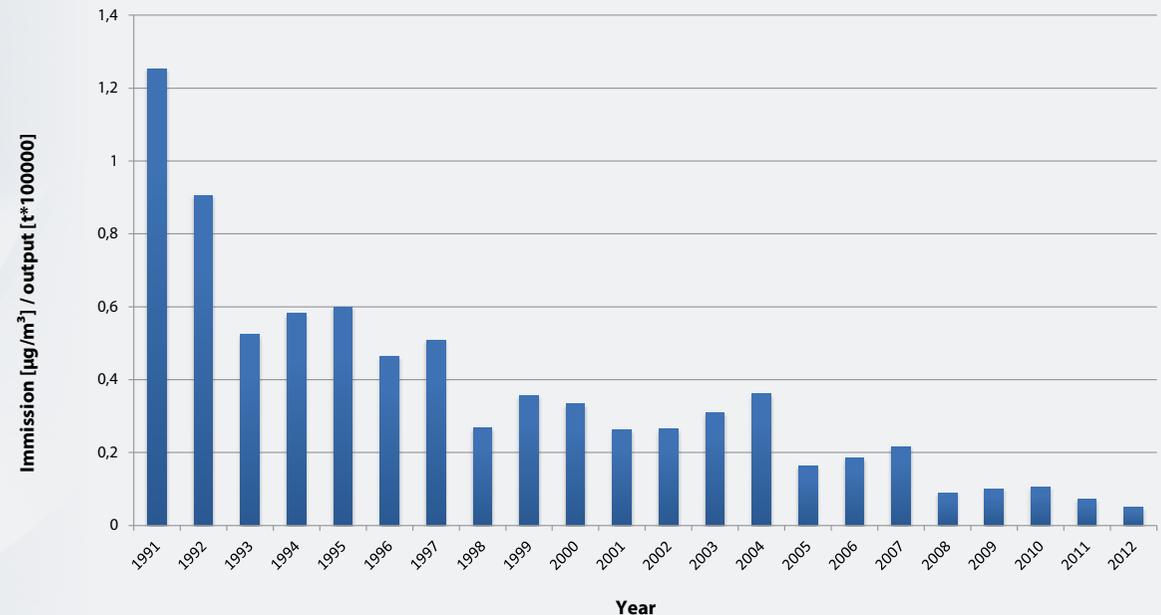
# TECHNOLOGY & ENVIRONMENT



## AN OUTSTANDING EXAMPLE THROUGH CONVICTION

Responsibility for the environment is the guiding principle of BERZELIUS Metall. The production subsidiaries of the group were among the first to be certified as users of the Integrated Management System for Quality, Energy, Occupational Safety and Environmental Protection. A continuous optimisation of processes and the resolute application of technological advances are guiding principles of the whole group.

### Pb-Immission per t output QSL



Consequently, environment-friendly processes have been introduced and all installations and storehouse facilities are fully encapsulated. Additionally, state-of-the-art technologies, including multi-stage gas cleaning trains and effluent management, reflect the efficiency of these measures. The use of closed-circuit recycling in all processes ensures that production of waste is avoided and that other products can be reliably recovered and re-utilised. The final impressive proof lies in emission values, which are constantly held at a low level.

The BMB invested around 19 million Euros in environment protection and occupational safety measures from 2006 to 2012, amounting to an annual expenditure of approximately 2.7 million Euros. Another 90 million Euros were invested in safety measures for installations and processes.

# CUSTOMER BENEFIT

## A HEAD START THROUGH SOLUTIONS

Technological leadership in products and processes, combined with reliable quality and on-schedule deliveries, are a sure basis for the long-lasting success of the BERZELIUS Metall customers. The Group is ready to support its co-operation partners by working out new ways and specifications to help in achieving their targets at any time.

The enterprise politics of advancing innovation, has a long-lasting effect on securing its site of location. BERZELIUS Metall relies on a climate of mutual trust both internally and in dealings with customers. A high sense of personal responsibility and specific promotions are fitting incentives for meeting delivery deadlines, even for most demanding assignments.

The goal-oriented management strategy, based on key operating figures, continually supplies transparency and planning security for customers.



## CERTIFICATES OF THE BERZELIUS GROUP

- DIN EN ISO 9001
- DIN EN ISO 14001
- ISO EN ISO 50001
- ISO 18001
- Specialists for disposal



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