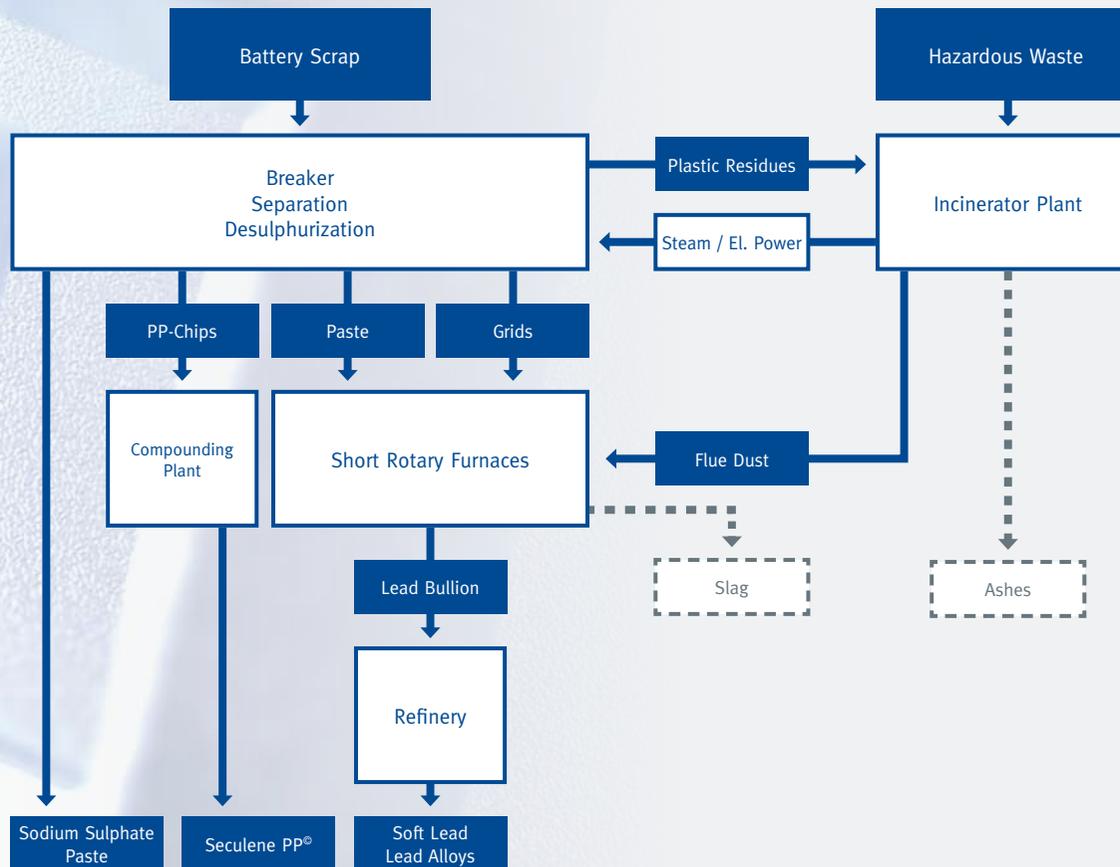


SECONDARY SMELTER WITH INTEGRATED INCINERATOR FOR HAZARDOUS WASTES



PROFILE



TECHNOLOGICAL EXCELLENCE

The Muldenhütten Recycling und Umwelttechnik (MRU), Freiberg, is the third largest smelter of lead in Germany. The smelter, established in the 14th century, was renovated to a secondary lead smelter in 1993/1994, using state-of-the-art technology and since then continuously modernized. From this time on, accumulator scrap is fully recycled, processed and cast to lead. 80 employees, of which 4 are trainees, process lead acid accumulators, scrap lead, lead-containing residues and crude lead to lead, lead alloys, sodium sulphate, PP compounds with the trade name Seculene® PP as well as master alloys for antimony and tin.

The Engitec process employed for the complete separation of old accumulators into their components, was acclaimed by the American Environment Protection Agency, EPA, as representing the best available technology. The integrated incinerator plant for hazardous wastes makes MRU Freiberg unique among German lead smelters. Non-recyclable plastics obtained from the treatment of accumulator scrap, together with scraps containing hazardous materials are incinerated here and energy is recovered.

With an average annual production of 55,000 tonnes lead and lead alloys, the Muldenhütten Recycling und Umwelttechnik GmbH is not only one of Germany's most advanced but also one of its most productive secondary lead smelters.

THE TREATMENT PROCESS

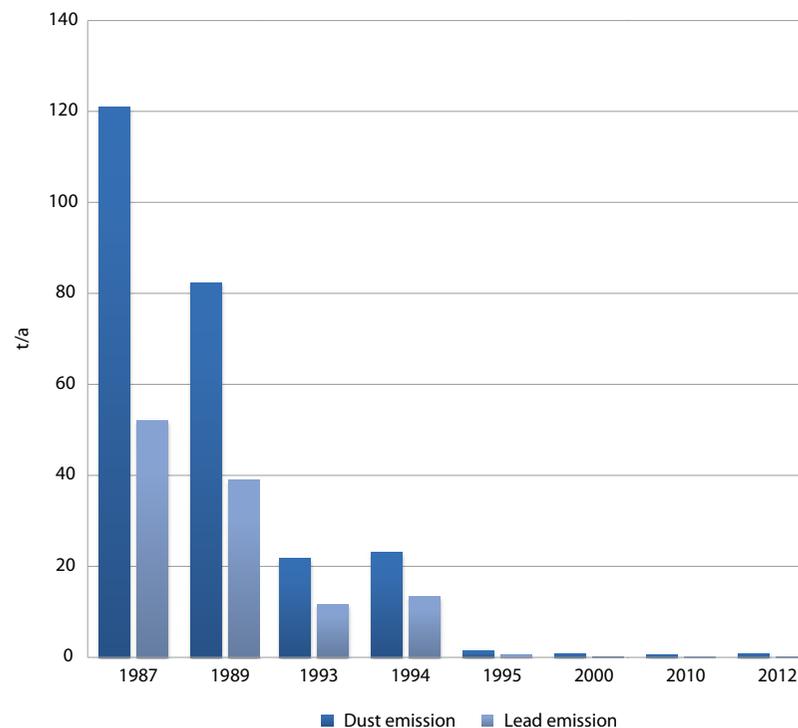
Used accumulators, still with their acid content, are delivered to a covered storehouse impervious to acids, where they are then separated into their different components, consisting of lead grids, lead paste, plastic separators like PVC, polyethylene, celluloid or glass fibres, housing materials like polypropylene or ebonite as well as sulphuric acid.

Before crushing the accumulator scrap, sulphuric acid is drained off, filtered and stored temporarily in tanks. A hammer crusher then breaks up the used batteries into pieces not exceeding 5 cm in size. These are charged to vibrating sieves where high-pressure water jets separate the lead paste fines from the coarser lead grids, poles and plastics. In the following liquid flow separator, the plastics are swept up with the upwards flowing liquid, leaving behind the coarse fractions which are then separated according to their densities. Non-recyclable plastics, e. g., separators and ebonite, are burnt together with hazardous wastes in the incinerator plant of MRU. The polypropylene is recycled in the company own compounding plant and sold as high-grade PP compound with the trade name Seculene® PP.

The lead paste obtained above is desulphurised using caustic soda solution, to deliver lead oxide and sodium sulphate so that in the following smelting process, emissions of SO₂ are minimised.



Development of dust and lead emissions
1987 – 2012



TECHNOLOGY



SMELTING

Lead grids, desulphurised lead paste, scrap lead and lead-containing residues like flue dust, ash, sludge and dross are melted at approximately 1,000 °C in two completely encapsulated, rotatable and hydraulically tiltable short rotary drum furnaces, each with a useful volume of 5 m³.

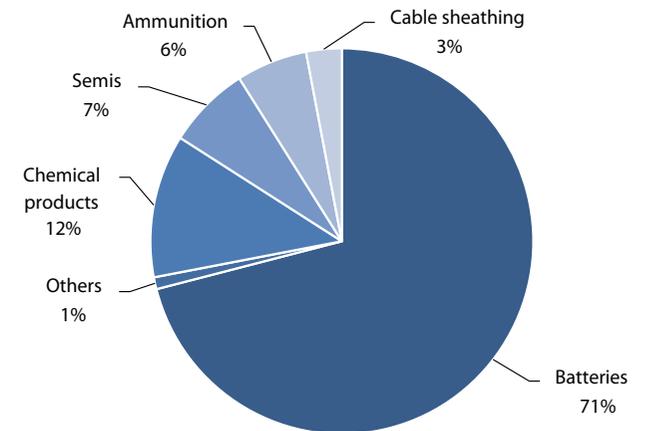
The liquid products, lead bullion with a lead content of at least 96 % and slag are poured into kettles and then processed further by refining. The slag is disposed of.



REFINING

The undesired impurities accompanying the lead bullion are removed individually in up to 10 steps in 13 refining kettles, each with a charging capacity of 100 tonnes. Specific lead alloys are produced by the controlled additions of alloying elements. The refined lead won is cast to ingots and large blocks.

Usage of lead in Europe



PRODUCTS & FIELDS OF APPLICATION

“F ” – A HALLMARK OF QUALITY

The product range of MRU Freiberg extends from 40 individual and exactly specified lead alloys to refined lead, lead bullion, cable lead, antimonial lead and lead-calcium alloys. Lead won at the Muldenhütten smelter is listed at the London Metal Exchange, LME, under the brand name “F ”. Sodium sulphate and PP compounds are also products of MRU.

About 1.1 million ingots, each weighing 45 kg, and, as required, larger blocks weighing 1,000 kg each are produced annually. For purposes of quality assurance, each of these is stamped with a batch number. The ingots are bundled to stacks of 25 ingots each, weighing about 1 t in total and laser-labelled with information regarding year, batch number, lead type, weight and stack number.



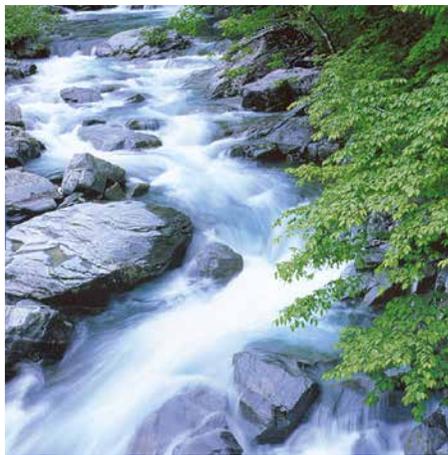
The average annual output consists of:

- 55,000 tonnes lead and lead alloys
- 4,500 tonnes sodium sulphate
- 7,000 tonnes PP chips
- 1,000 tonnes antimony master alloys

The MRU's own incinerator plant processes 20,000 tonnes of hazardous wastes annually. Lead and lead alloys produced at Freiberg are used primarily for starter batteries in the automotive industry and as batteries for industrial purposes, e. g., batteries for forklift trucks or accumulators used for various purposes, like supplying emergency power. The listed “F” lead is an essential material for the cable and chemical industries.

Sodium sulphate from Freiberg is a much sought after raw material in the glass and detergent-producing industries. PP granules produced in Freiberg are extruded to high-quality Seculene® PP compounds.

TECHNOLOGY & ENVIRONMENT



ENVIRONMENT RESPONSIBILITY IN PRACTICE

The environment-friendly practice of completely encapsulating the installations, together with the introduction of highly efficient filters for the dust removal systems and off-gas cleaners integrated in the plant, ensure that dust and lead emissions are constantly maintained at values lower than 10 % of the statutory threshold limits laid out in the German "TA Luft" (technical guidelines for clean air).

The consequent use of optimised technologies and processes together with closed-circuit material recycling ensures that by-products can be recovered and, at the same time, limits the amount of waste produced to a minimum. The separation of cooling and process water streams coupled with state-of-the-art effluent treatment plants and process control systems, underlines the high level of environmental consciousness.

Waste heat from the incinerator plant is re-utilised in the form of process steam for the recrystallisation of sodium sulphate and as a heat transfer medium in the heating network of the company. As a recognised member of the Environmental Alliance of Saxony, MRU Freiberg fulfils an exemplary function. Further proof of this is in the certification of the whole production process according to the management system for quality and environment protection, and this since decades.



CUSTOMER BENEFIT

RELIABLE PARTNERSHIP

With the application of state-of-the-art technologies for all plant installations, the Muldenhütten Recycling und Umwelttechnik GmbH guarantees security for jobs and site location. Investments since 1993 amounting to 40 million Euros, are proof of the future oriented strategy of the enterprise. MRU consequently and constantly offers its employees courses in further training and development, making it a much sought after and valued employer: on the average, an employee remains with this company for 20 years.

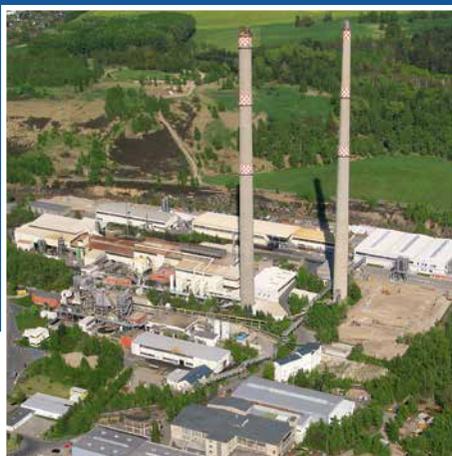
MRU Freiberg, a long proven partner of the economy, is a supplier of lead and its alloys, and, at the same time, a recycler of products and by-products. Products of excellent quality, comprehensive customer care and service, and decisive management ensure reliable benefits for customers. An integrated goal-oriented management strategy based on key operating figures is a prerequisite for a confidential partnership.



CERTIFICATION

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





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