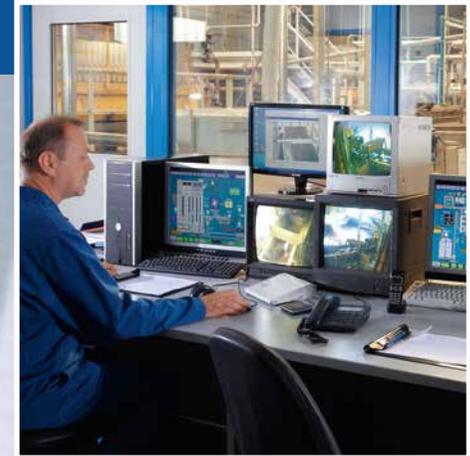
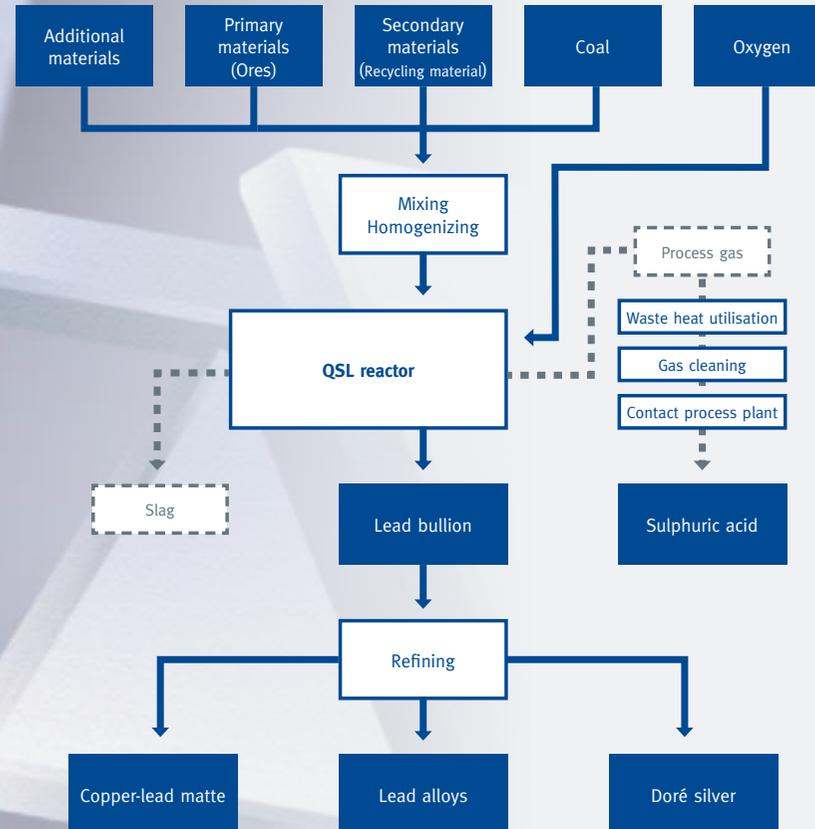


PRIMARY SMELTER WITH QSL TECHNOLOGY



PROFILE



LEADING IN LEAD SMELTING TECHNOLOGY

The BERZELIUS STOLBERG GmbH (BBH), Stolberg, is one of the largest and most advanced primary lead smelters of the world. The smelter, established in 1848, achieved this distinction through the introduction of the QSL process technology in 1990. Ever since, this company, employing about 200 workers, is an international leader in technology for lead smelting and environment protection measures.

The QSL technology makes it possible to win lead from lead ores and secondary raw materials in a single encapsulated aggregate which, in comparison to conventional technologies, has a noticeably lower specific energy consumption. The energy requirements sank from 15.2 right down to 4.5 GJ per ton of lead produced, by exploiting the energy of the sulphides contained in the ores as the main source of energy. The wide range of materials which can be charged, underscores the efficiency of this process.

The annual production of 155,000 tonnes of lead its alloys as well as 120,000 tonnes of sulphuric acid also set distinctive international standards.

QSL TECHNOLOGY

TREATING

The treatment process consists in homogenising the sulphides-containing lead ores and secondary raw materials together with coal and water in continuous mixers. These are then smelted in a 33 metre long horizontally lying QSL reactor divided into an oxidation zone, 3.5 metres in diameter and a reduction zone with a diameter of 3 metres.

SMELTING

Conveyor belts feed the premixed charge through feed ports to the reactor. Pure oxygen is blown in through tuyères at the bottom of the reactor at temperatures of 1,200 °C. In the resulting oxidation zone thus created, lead bullion containing impurities of copper,

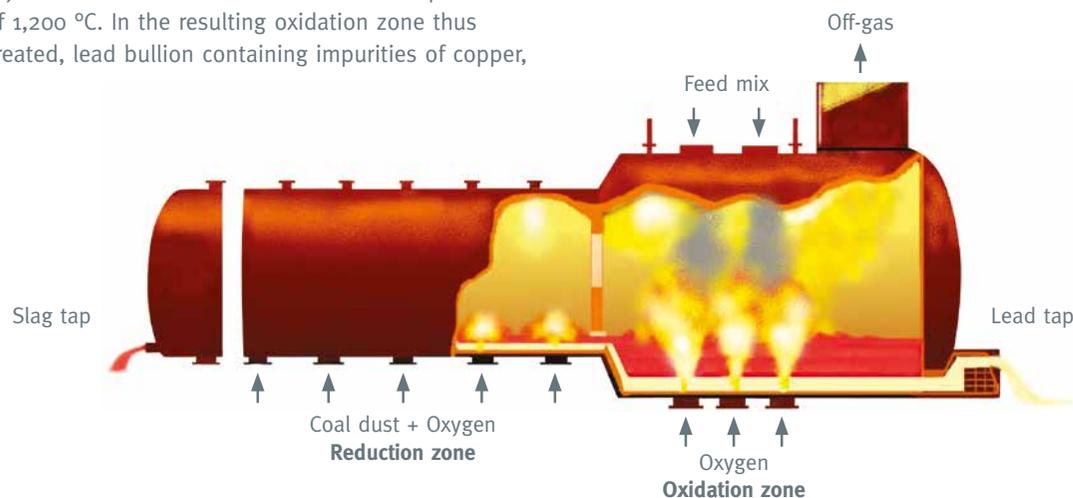
silver, other precious metals, antimony and bismuth is produced. Due to the slightly inclined construction, the lead bullion at a temperature of more than 1,000 °C flows to the front end of the oxidation zone. The off-gas is cooled down to 400 °C, cleaned in a number of steps and the therein contained SO₂ converted to sulphur dioxide of especially high purity. Primary slag, containing a residual amount of lead in the form of lead oxide, is also created in the oxidation zone, and flows in a counter-current into the reduction zone. Coal dust charged here, reduces the lead oxide in the slag to metallic lead which then flows back to the oxidation zone.

TAPPING

The siliceous slag is tapped from the rear end of the reduction zone and quenched using powerful water jets to sand with a grain size of 1 millimetre. This glassy granulate has the trade name BERZELIT®. Metallic crude lead is siphoned off continuously from the front end of the oxidation zone into cooling kettles where it is decopperised. Further treatment is carried out in the refining process.

REFINING

Lead is refined in 24 kettles, in which the individual impurities of the lead bullion are removed selectively in up to 9 steps – clearly a more complicated procedure than in secondary smelters. The lead produced has an especially high grade of purity and also serves as starting material for making precisely defined lead alloys by adding specific amounts of copper, calcium, tin, silver or tellurium.



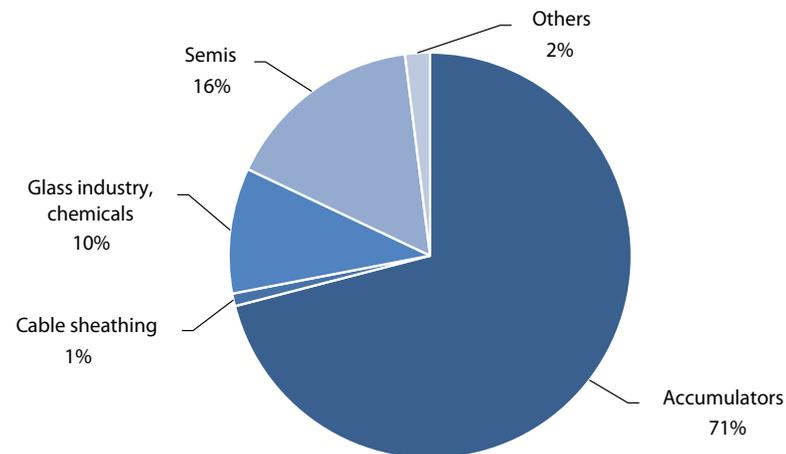
USAGE OF LEAD IN GERMANY



Primary lead from Stolberg is used for starter batteries in the automotive industry, in accumulators for delivering emergency electricity and also in the solar industry. The high-grade material lead is essential for protection against radiation, for manufacturing optical glasses and lenses, for making installations acid-proof, as vibration dampers for machines and buildings, for roofing, sound proofing in the construction industry or as cable sheathing.

Sulphuric acid from BBH Stolberg plays an important role as a basic material in the chemical industry. Copper-lead matte is sold for further processing to copper smelters. BERZELIT® slag can be used for the construction of roads and dumps.

Usage of lead in Germany

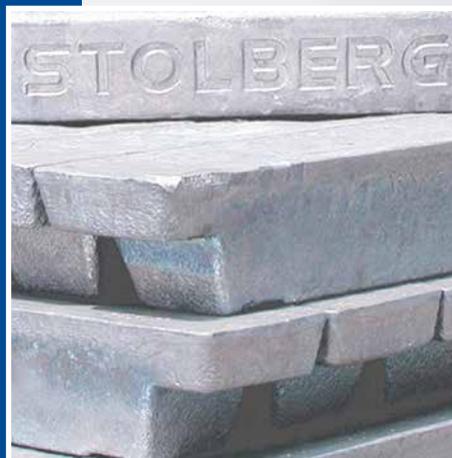


PREMIUM ON PRECISION AND PURITY

The high purity, high grade listed brand of lead produced at BBH has the seal of approval STOLBERG. This is a guarantor of tested purity with impurities of 0.01 %. More than 100 different lead alloys made to exactly defined specifications as well as pure sulphuric acid emphasise the status of BERZELIUS Stolberg as a foremost producer.

The range of products also includes doré silver – won by the removal of precious metals from lead – containing 99.6 per cent silver as well as gold and platinum. Copper-lead matte and BERZELIT® slag round off the product spectrum.

Annually, 3 million lead ingots, each marked permanently with the lot number, are produced in Stolberg. 25 bars, each weighing 50 kg, are strapped together to packets weighing 1.25 tonnes and are stamped for purposes of quality assurance with a serial lot number.



The average annual production is:

- 155,000 tonnes lead / lead alloys
- 120,000 tonnes sulphuric acid
- 60,000 tonnes BERZELIT® slag
- 6,000 tonnes copper-lead matte
- 350 tonnes silver

TECHNOLOGY & ENVIRONMENT



ENVIRONMENT PROTECTION – INCENTIVE AND RESPONSIBILITY

The encapsulated single-step process and compact construction of the reactor help conserve the environment by constantly keeping emissions and energy consumption low. In downstream waste heat boilers, the hot flue gases rich in SO₂, are cooled from 1,200 °C down to temperatures of 400 °C. The steam thus created, turns a turbine generating enough electricity to cover 75 per cent of the energy requirements of the site. Process gas is cleaned in a number of consecutive steps in a state-of-the-art system.

Thus, mercury is removed from the process gas in special aggregates and cadmium, enriched in the flue gases, is removed separately.

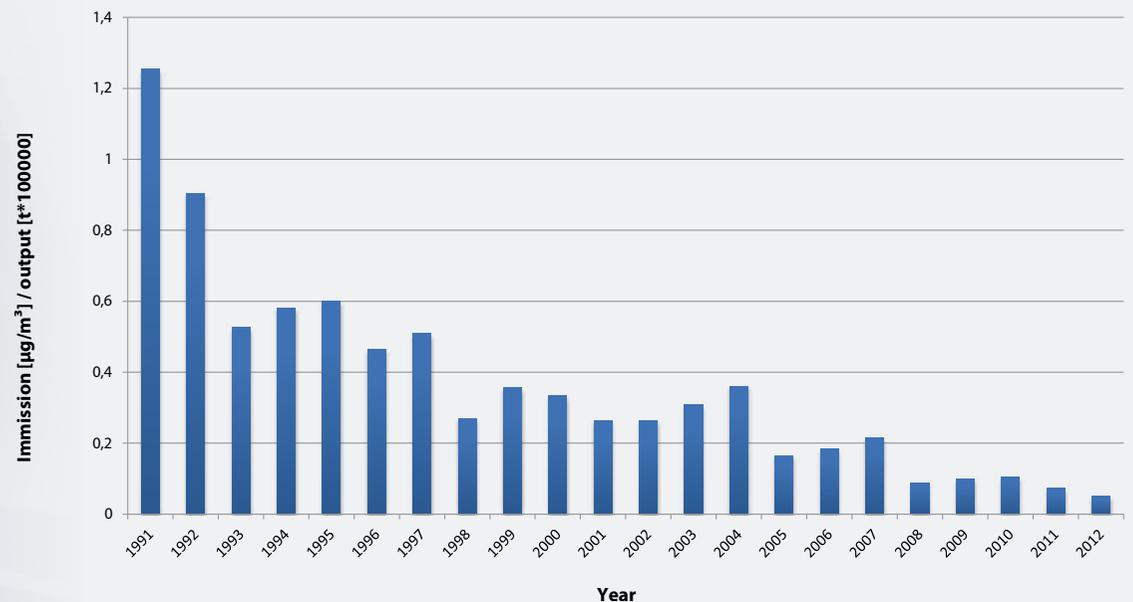
Target-oriented material management prevents these elements from entering the environment.

With the 2009 inaugurated Bayqik system to reduce the SO₂ concentration outside the sulfuric acid plant 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 tons of sulfuric acid is achieved.

Using the sulphur-content of the sulphides as the main source of energy reduces the CO₂-evolution to a third of that produced by conventional processes. The closed-circuit recycling system used ensures a consequent re-utilisation of products and an avoidance of wastes. The high proportion of useful products in the total production volumes together with the low emissions underlines the high efficiency. This is also reflected in the certification as a company operating in accordance with the integrated management system for quality, energy and for occupational and environmental safety.

BERZELIUS Stolberg also sets an outstanding example in the handling of effluents, which are cleaned and their amount minimised by repeatedly reusing them as process water. Cooling water, kept separate from process water, is also recycled.

Pb-Immission per t output QSL



CUSTOMER BENEFIT

FUTURE-ORIENTED TECHNOLOGY AND PRODUCTS

By employing state-of-the-art technologies throughout the whole value added chain, the Stolberg smelter ensures long-term security for both jobs and site of location. A complex process control system which conform to the latest standards, controls and regulates the production process around the clock. Just between the years 2000 to 2012, the company invested 42 million for environmental protection and safety measures for plant and processes.

Constant employee qualification and safe working conditions through preventive occupational and health safety measures make BBH a much sought after employer. Proof of this is the strong identification of employees with this company – the average employee has been working here for about 18 years.

Reliable product quality, on-schedule delivery, customer orientation and constant economical management also bring advantages for the customer. The dogged adherence to an integrated goal-oriented management strategy based on key operating figures, guarantees a partnership based on mutual confidence and reliability.



CERTIFICATES

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





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