

PRIMARY SMELTER WITH QSL-TECHNOLOGY



TECHNOLOGY LEADER LEAD- AND SILVER PRODUCTION

The **BERZELIUS STOLBERG GmbH** (BBH), Stolberg, is one of the largest and most advanced primary lead smelters of the world with an integrated silver refining plant.

The smelter, established in 1848, achieved this distinction through the introduction of the QSL process technology in 1990. Ever since, this company, employing about 280 workers, is an international leader in technology for lead smelting and environment protection measures.

The QSL technology makes it possible to process lead ores and secondary raw materials to extract lead, silver and gold in a single encapsulated aggregate with lower specific energy consumption. In comparison to conventional technologies, only 30 per cent of energy is required.

The integrated processes in BBH production allow the raw materials used to be processed sustainably. With capacities of 180,000 tonnes of lead/lead alloys, 145,000 tonnes of sulphuric acid, 18,000 tonnes of copper lead-matte and 1,200 tonnes of doré silver, the metals are extracted or recycled and fed into the production cycle. With this approach BBH operates with a closed loop recycling methodology.

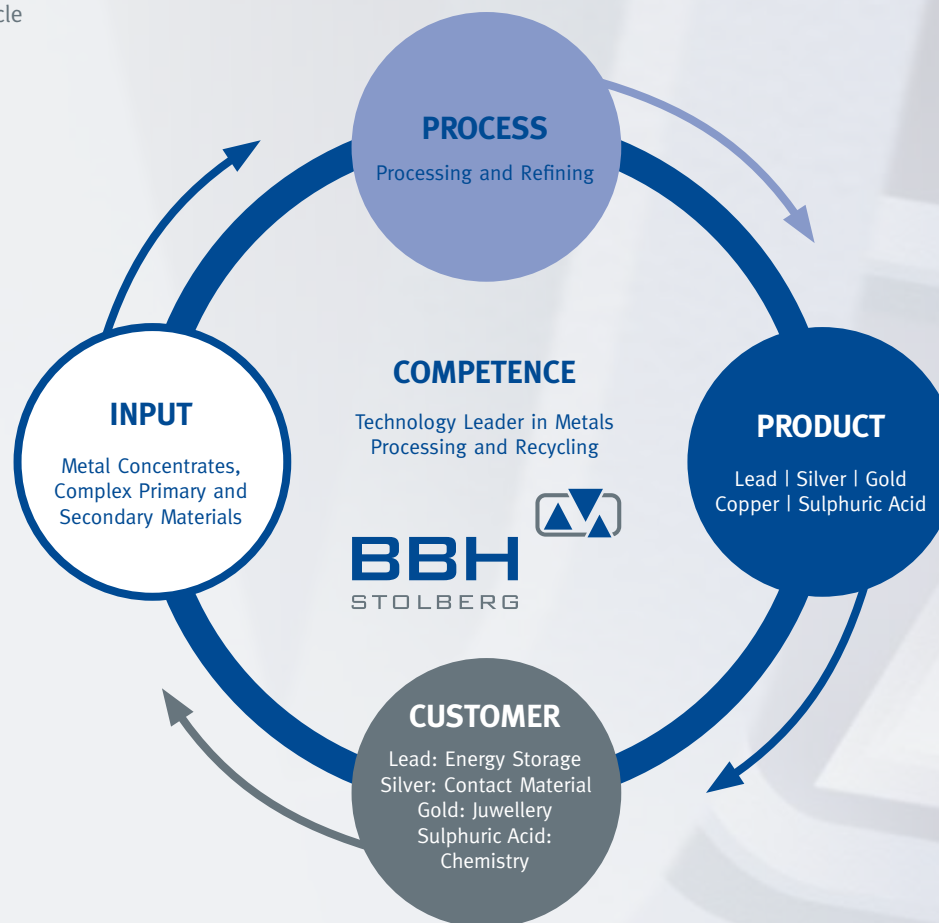


„As a global technology leader in lead production, we are a competent service provider for the reworking of metal concentrates and complex materials - legally compliant, highly efficient and environmentally friendly.“

Dr.-Ing. Urban Meurer
Managing Director BBH

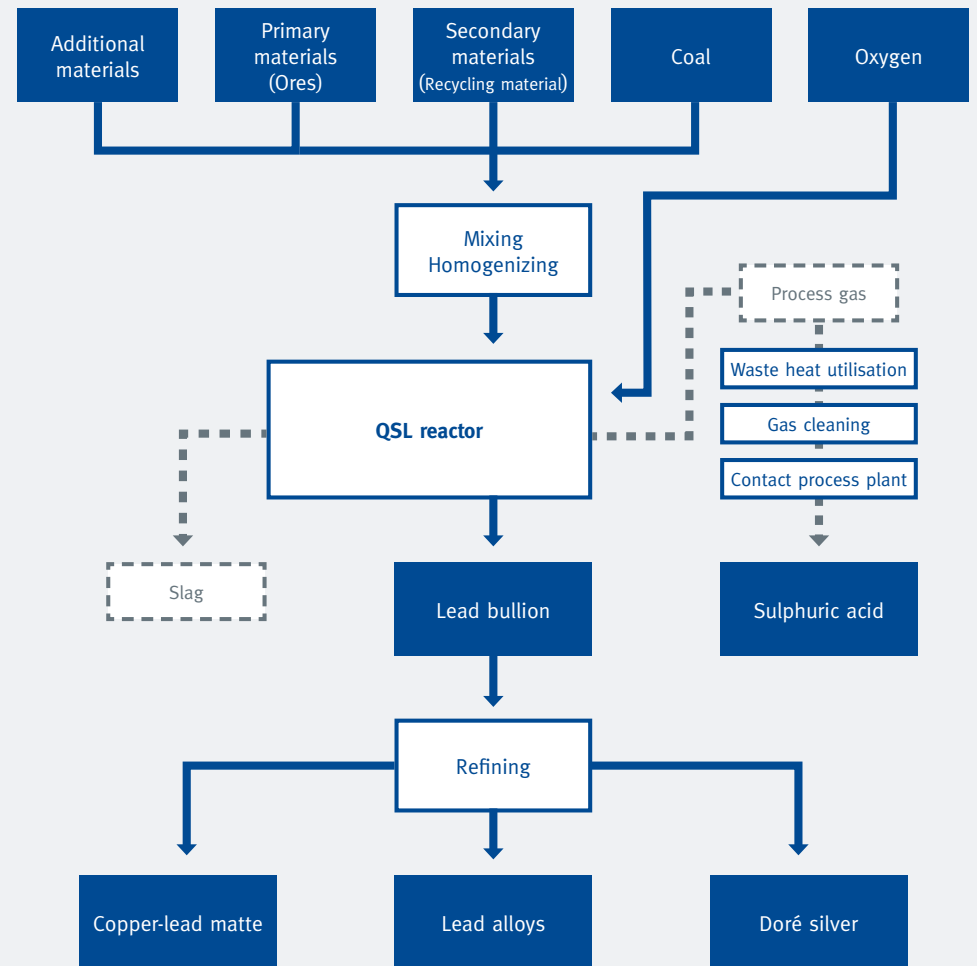
SUPERIOR TECHNOLOGY AND SERVICE OFFERING

BBH Business Cycle



Range of services of BBH

- Efficiency-optimised production processes thanks to state-of-the-art equipment
- Technical capability to process complex materials
- Production of primary metals (in particular lead, silver, gold and copper) and sulphuric acid
- Metal recycling (in particular lead, silver, gold and copper)
- Legally compliant, certified and environmentally friendly processes
- Tailor-made logistics solution for the worldwide receipt of raw materials including warehouse and rail connection
- Process safety according to SEVESO III guidelines
- Certified Quality, Energy and Environmental Management Systems



BBH Process Chart



„Customer-focused processes and targeted consulting distinguish us.

We have implemented an international transshipment warehouse in Vlissingen that meets the requirements of SEVESO III. Thus, we offer our partners a unique and cost-optimised service for the handling of complex materials.“

Sander De Leeuw

Director Raw Materials BERZELIUS /
ECOBAT Technologies



QSL TECHNOLOGY

QSL REACTOR

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

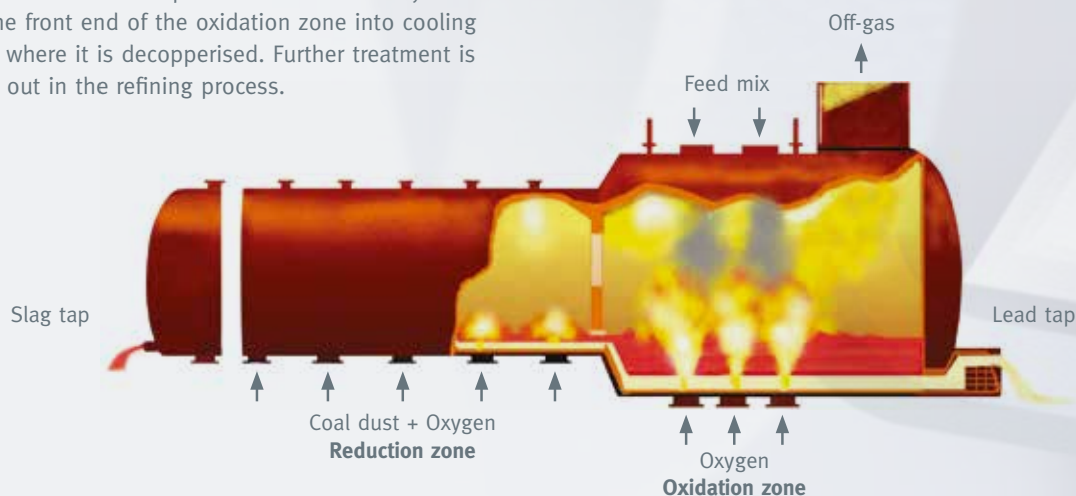
SO₂ converted to sulphur dioxide of especially high purity. Primary slag, containing a residual amount of lead in the form of lead oxide, is also created in the oxidation zone, and flows in a counter-current into the reduction zone. Coal dust charged here, reduces the lead oxide in the slag to metallic 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.



FURTHER PRODUCTION PROCESSES



THE REFINERY

THE LEAD REFINERY

Lead is refined in 30 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.

Each removal step takes place in a special kettle. By adding zinc, for example, the silver is discharged as rich foam; for bismuth, a magnesium-calcium alloy is used.

The purified lead is pumped from one refining step to the next.

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.

They are cast and sold to the industry in ingot shape.

THE SILVER REFINERY

In the 3 refining steps liquation, distillation, and conversion, the silver is processed in the silver smelter to doré silver. The silver is fed into the liquation plant as rich foam and the product is an alloy of silver, zinc and lead. This alloy is supplied to the vacuum induction furnaces. In the following process, the zinc is separated and recovered.

The silver-lead alloy coming from this process is then fed to a converter where the lead is removed by oxidation. The almost pure silver, which then also contains gold, is cast into anodes in a fully automated machine. The anodes are sold to gold and silver refineries for further processing.

PRODUCTS OF BBH



APPLICATION FIELDS OF LEAD, SILVER AND RAW MATERIALS

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. Silver and copper are important metals used in electrical connectors.

Sulphuric acid from BBH Stolberg plays an important role as a basic material in the chemical industry. The processed copper-containing intermediate product copper-lead matte is sold for further processing by copper smelters.

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

PRODUCTION CAPACITY OF BBH (AS OF 2018):

- 180,000 tonnes lead / lead alloys
- 145,000 tonnes sulphuric acid
- 18,000 tonnes copper-lead matte
- 1,200 tonnes silver
- 3,600 tonnes gold



PREMIUM IN PRECISION AND PURENESS

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 of 99.99 per cent. 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 lead 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 chemically pure sulphuric acid round off the product spectrum.

TECHNOLOGY & ENVIRONMENT



ENVIRONMENTAL PROTECTION AS AN 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 50 per cent of the energy requirements of the site.

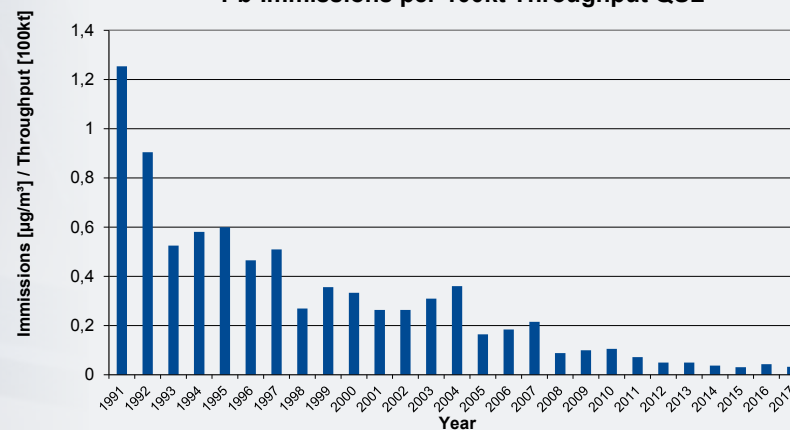
Process gas is cleaned in a number of consecutive steps in a state-of-the-art system to guarantee that no fugitive emissions are released into the environment.

BBH has invested more than 60 million euros in environmental protection and process technology since 2000.

The housing of all production facilities, the construction of the raw material storage hall, the expansion of the modern filter systems and other measures have led to a reduction in lead emissions of around 92 per cent compared with 1991. The commissioning of the Bayqik plant, a process developed jointly with Bayer Technology Service, reduced SO₂ emissions from sulphuric acid production by 60 per cent.

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-Immissions per 100kt Throughput QSL



VALUES AND QUALITY

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.

BBH continuously invests in the optimisation of the production plants, especially with focus on 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 16 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.



Certifications, which are checked in regular audits by independent bodies, guarantee the long-term success and sustainability of BERZELIUS Stolberg GmbH.

CERTIFICATIONS

- DIN EN ISO 9001
- DIN EN ISO 14001
- DIN EN ISO 50001
- OHSAS 18001
- Specialised Waste Management Company





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