



Boliden Kokkola Oy

a pioneer in zinc technology

WITH BOLIDEN

Boliden Kokkola Oy is a knowledgeable and fair company to do business with. You can always count on our products and promises.



Dependable skill

Boliden is one of the leading mining and smelting companies in Europe with approximately 4,500 employees. The group's production plants are in Finland, Sweden and Norway. The group has mines in Sweden and Ireland.

Boliden's main products are zinc and copper, in addition to which the company also produces gold, silver and lead. The company has two zinc plants, one in Kokkola, Finland and another in Odda, Norway.

The top of the zinc world

The zinc plant in Kokkola started operations in 1969. Thanks to determined development work, it is now one of the leading zinc manufacturers in the world,

whose products are renowned for their high quality both at home in Finland and on the international market.

The zinc plant in Kokkola is one of the biggest zinc plants in the world. Its annual production capacity is 306,000 tonnes a year. The main products are pure zinc and zinc alloys.

The zinc plant has adopted a mode of operations which aims at continuous development. Our position at the top of the zinc world is based on a high degree of automation, use of the latest production technology in the sector and on development of our own process. Thanks to these efforts, we are able to produce zinc efficiently in an environment-friendly and energy-efficient manner.

Our operations are certified in accordance with the ISO 9001 quality management system, ISO 14001 environmental management system and OHSAS 18001 occupational health and safety management system.

A specialist in the field

Great expertise is required for the manufacture of high-quality zinc. At the zinc plant in Kokkola, quality is ensured through a highly advanced production process and skilled staff, who possess in-depth qualifications in zinc production. It is the skills and knowledge of our



expert staff that have enabled Boliden Kokkola to become an international pioneer in the field of zinc.

We have sought new solutions to zinc production in an unprejudiced way. One of the results is the method of direct leaching of zinc concentrate developed at Kokkola, which has brought more variety to the range of zinc concentrates available to zinc plants.

In order to ensure competitiveness, it





Zinc's high quality and complete reliability provide the basis for confidential customer relations.

is important to master the entire chain of zinc production, from acquisition of raw materials to sale of the finished product. The deep-water port on the premises of the Kokkola plant provides us with a good logistics base, something that the customer benefits from in the form of unfailingly reliable deliveries.

Dependable cooperation

The strength of the zinc plant in Kokkola is in its highly skilled and

motivated staff, whose wellbeing is important to us. According to our view, wellbeing at work is founded on being able to cope with one's job mentally, and in order to do this, it is important to feel in control of one's own work.

The production technology we use is safe, both for the environment and for the people who control the process. Our aim is to have an accident-free work environment, and we take occupational safety and health-related matters into

account in every aspect of planning the work and in people's practical tasks.

Boliden Kokkola Oy is the biggest private employer in Kokkola. We are a skilled and fair partner for our clients, our staff and other stakeholder groups, a partner whose product and promises can always be depended on.

Boliden Kokkola is an international pioneer in zinc technology.



Modern technology is kind to the environment

Most of the raw material used by the zinc plant comes from mines in Europe and North America. Our principal raw material is sulphidic zinc concentrates, with a zinc content of just over 50 per cent.

In order to get the best results, we mix different types of concentrate, which are processed into high-quality metallic zinc in our production process. During its various stages, the production process also produces energy and other substances which are utilized by the zinc plant itself, turned into products for sale or removed from the process.

Roasting

At the first stage of the production process, the zinc concentrate is fed into two parallel fluid bed roasters, where the concentrate is roasted at a temperature of 950 degrees Celsius.

The sulphur dioxide gas produced



during the roasting is cooled and the heat it contains is recovered. Pure mercury is separated from the gas and processed into a saleable product. The sulphur dioxide in the gas is used for the manufacture of sulphuric acid.

Leaching

Next, the zinc calcine resulting from roasting and the concentrate fed through direct leaching are leached in sulphuric acid recycled from electrolysis, and this produces zinc sulphate solution. Iron is precipitated and fil-

tered from the process in the form of jarosite.

The sulphides in the concentrate are oxidized into elemental sulphur, which is separated from the jarosite through flotation. The resulting concentrate is filtered, washed and stored in a separate basin.

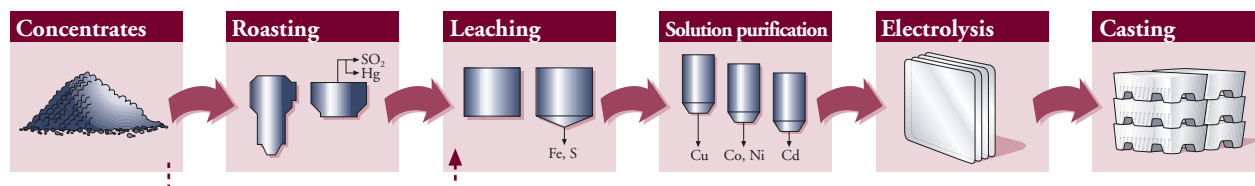
Solution purification

After leaching, the zinc sulphate solution contains small amounts of impurities, which must be removed from the solution through precipitation before electrolysis. Purification is performed in a continuous three-stage process.

After the third stage of the purification process, the zinc sulphate solution will contain about 150 grammes of zinc per litre. The solution is cooled and pumped into the electrolysis stage.

Electrolysis

The zinc is separated from the solution using an electric current. Metallic zinc is precipitated onto aluminium cathode





Boliden Kokkola makes use of the most up-to-date technology in its production.

plates where it is allowed to build up for about 36 hours.

The cathodes are then removed from the solution and replaced with new cathodes. The zinc is stripped from the aluminium plates using automatic stripping machines.

Smelting, alloying, and casting

The cathode zinc is smelted in electric furnaces, and the zinc is then cast in either 25 kilo ingots or jumbo ingots of up to 2,000 kilos. The jumbo ingots are alloyed with aluminium or other metals according to the customer's specifications.

After all the stages in this process are complete, the zinc is a finished and saleable product. As much as 85 per



cent of the zinc produced at Kokkola is exported. Our customers operate in the EU.

Responsible production methods

The foremost aims in the continuous development of process technology are

efficiency, profitability, and attention to environmental impact. At Boliden Kokkola, efficient production and respect for the environment go together naturally, since use of the latest technology enables us to minimize environmental impact.

Our own research operations develop new solutions which help reduce the environmental impact from our production even more. We have attained significant results both in limiting emissions and conserving energy.

Most zinc is used as protection against corrosion in steel products.



An essential metal

Zinc leaves our plant in Kokkola in the form of zinc ingots or jumbo ingots, but in actual fact zinc is a gift from Mother Nature that is constantly present in our lives. Zinc plays an important part in the cycle of life and it therefore exists everywhere in our environment — in both soil and water.

All living beings require zinc to grow and develop. For human beings, zinc is an essential trace element which supports many of our vital functions. Without zinc, there would be no life.

Galvanizing is a durable solution
Zinc has many uses as a metal. It is the fourth most used metal in the world after iron, aluminium and copper.

Zinc is mostly used to protect steel



from corrosion. Zinc forms a protective layer over the surface of the steel, making steel products more durable. Even a very thin layer of galvanizing with zinc can multiply the useful life of a steel product. A galvanized steel surface needs no maintenance.

In extending the useful life of products in this way, zinc saves considerable natural resources and energy which would otherwise be needed to manufacture new products. Zinc is a durable solution both for the individual product and the environment at large.

Steel products can be galvanized in many different ways. The choice of method influences the durability of the product, its appearance and its mechanical properties. The use of zinc has grown most rapidly in the building industry, the automotive industry and the transport industry, where products are required to last a long time.

Brass looks good

When zinc and copper are alloyed, the result is brass, which is a very versatile material thanks to its special characteristics. Brass has an earthy, warm colour, which makes it popular in architecture and interior decoration. Brass is also inexpensive and easy to work. Brass products include various



types of doorknobs and door handles, fittings, vents and fixings.

Zinc has many uses

Die-cast zinc is an excellent casting metal. Some of the products made of die-cast zinc that everyone is familiar with include door handles, locks, the locking mechanisms of zippers and various tools and machines. Rolled zinc products are used in the building industry for roofs, cladding and guttering.

Some zinc is used for the manufac-



Zinc makes a sustainable solution from the point of view of the product and the environment.

turing of zinc-based chemicals. The use of zinc oxide is well-established in the rubber and car tyre industries and the cosmetics and pharmaceuticals industries. Zinc powder is used in the manufacture of special anti-corrosive paint.

Raw material of the future

Zinc is a valuable material even after the end of the lifespan of a zinc product. Zinc can be recycled indefinitely without any change in its physical or chemical properties.

By now, about 30 per cent or 2.9 million tonnes of the zinc raw material used every year comes from recycling. It is predicted that this percentage will increase even more as more scrap is recycled.

Zinc products which are recycled are used for the manufacture of zinc oxide and zinc powder. Most of the zinc used in the rubber and car tyre industries and in paint manufacture is recycled raw material.

The maintenance-free lifespan of

zinc products and galvanized goods may be up to 100 years at its best, so zinc comes back for recycling at a very slow rate. However, the excellent recycling potential ensures that the zinc manufactured at Kokkola today will be valuable raw material for generations to come.

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