
BOLIDEN NO.1
IN E-RECYCLING

Electronics for all

Electrical and electronic products are increasingly part of our everyday lives. But at the same time, many countries are introducing legislation requiring the collection of scrap electronics – a trend that is creating both an ever-growing market for recycling materials and a new source of raw materials for metal production. One might say that tomorrow's mines can be found in our towns and cities.

Scrap electronic products must be processed and the metals they contain recycled in a way that ensures the minimum possible environmental impact.Boliden's Rönnskär copper smelter has been processing different types of recycling materials since the 1960s, and it is this in-depth experience, coupled with technologies developed in-house and extensive capacity for processing these materials, that has won Boliden its position as a world leader in this sector.

Multi-material capacity

Most of the smelting materials processed at Rönnskär comprise metal concentrates from Boliden's own mines and mines elsewhere in the world. The smelter has the capacity, however, to handle numerous different types of raw material, including an ever-growing percentage of recycling materials of one kind or another.

Scrapped and collected electronic products have accounted for the biggest increase in material type in recent years, primarily in the form of circuit boards from computers and mobile phones, etc. Our suppliers are mainly based in Europe.

Rönnskär's location in northern Sweden demands a high level of logistical efficiency. The smelting materials are delivered by sea to our own port, and by rail.

A train leaves Rönnskär every day, laden with copper for customers in southern Sweden. On the return journey, this "Copper Shuttle" train carries containers full of electronic scrap that are loaded on board at the port of Helsingborg.

Before arriving at Rönnskär, the e-scrap undergoes pre-processing in the form of dismantling and crushing. Glass, a certain amount of plastic, and iron and aluminium are also separated out, because it is the copper, gold and silver content that has value for the smelter.

All of the smelting materials are sampled before entering the processing line. This sampling work is important in determining the metal content of the material and the analysis forms the basis for the payment received by the supplier.

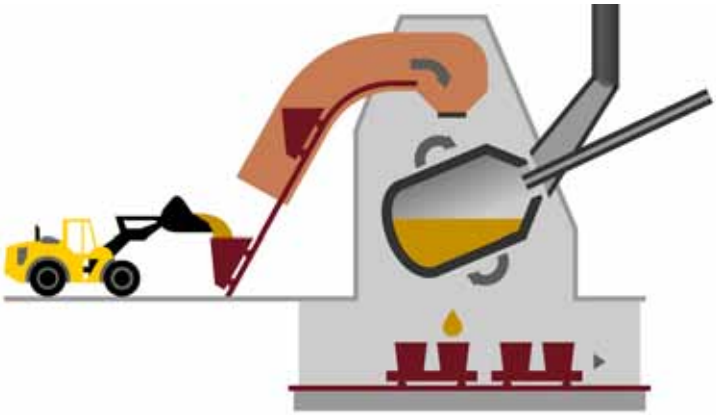
The sampling plant contains a heat-hall for containers and equipment for unloading material from containers and big bags. An e-scrap shredder crushes the circuit boards that are delivered whole and the material lots are then sampled in the stream sampler and delivered to a storage facility where they are mixed before smelting.

Unique Kaldo technology for electronics

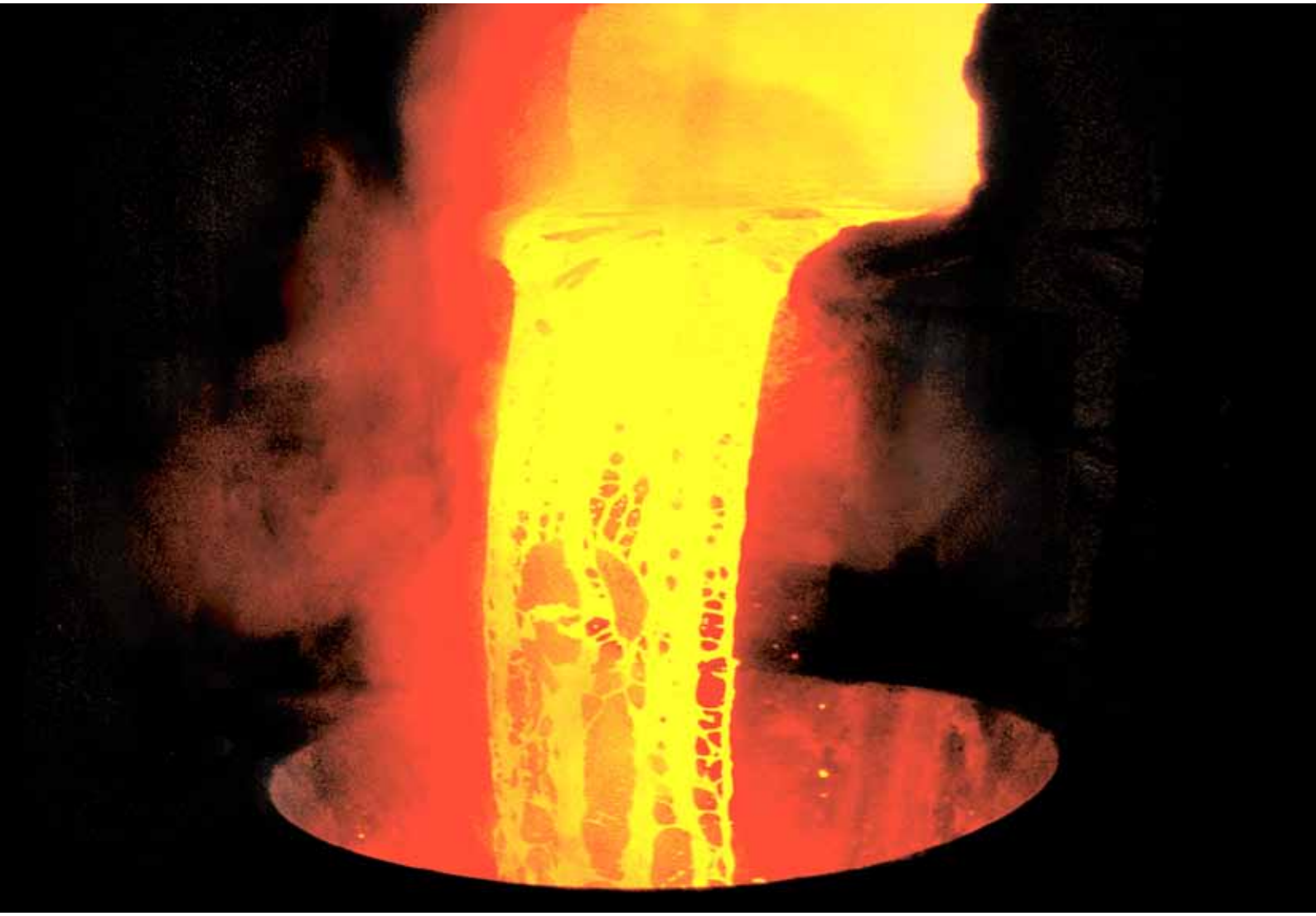
Boliden's use of Kaldo technology is unique. It was initially developed within the steel industry in the 1940s and has since been further developed by Boliden for smelting electronic scrap.

The Kaldo furnace is essentially a slightly leaning cylinder which rotates during the smelting process. The material is fed in and tapped out through the mouth of the furnace. There is no need to input any energy into the furnace: the plastic in the input raw material provides sufficient energy for the smelting process. The large amounts of energy released are recycled and converted to electricity or district heating. The smelted electronic scrap, known as black copper, is integrated with the smelter's main copper flow for further refining and the extraction of copper and precious metals.

Rönnskär's electronic scrap recycling operations expanded substantially in conjunction with the investment in the new material processing and smelting facilities that were commissioned in early 2012. An e-Kaldo plant complements the existing Kaldo plant, yielding a combined annual production capacity of 120,000 tonnes.



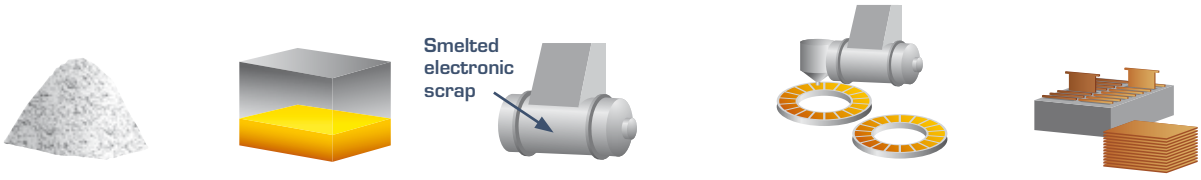
Continuous metal flow



Recycling materials account for an increasingly large percentage of the smelter's total metal flow and boost the value of the copper flow. Two thirds of the gold refined at Rönnskär comes from recycled materials. The broad raw materials base also heightens the smelter's competitiveness.

The metal is produced in a number of separate stages. The raw materials are smelted and refined to produce metals such as copper, gold and silver. The copper production process upgrades the purity level of the input copper from approximately 25% to 99.99%.

COPPER PRODUCTION



Metal concentrate 25% | Smelting 55% | Converting 98% | Anode casting 99% | Electrolytic Refining 99,99%

Metals for a modern society

There is hardly a product in today's society that does not either contain metals or is dependent on metals for its manufacture.

Metals can be recycled over and over again without losing any of their quality. The electrical and electronic products released on to the market and subsequently scrapped, are processed and the metals they contain are extracted and used in new products.

Electronic products have provided us with a new raw materials source that both enhances energy efficiency and helps conserve resources in Boliden's processes.

Boliden is a metals company with a commitment to sustainable development. Our roots are Nordic, our business is global. The company's core competence is within the fields of exploration, mining, smelting and metals recycling. Boliden has a total of 4,400 employees and an annual turnover of SEK 40 billion.

The Rönnskär copper smelter is located outside Skellefteå in northern Sweden. Rönnskär was built between 1928 and 1930 to process the ore found in the Boliden Area in 1924. Nowadays, the plant processes several different types of raw material, ranging from mined concentrate to electronic scrap and other types of recycling materials. The smelter produces over 200,000 tonnes of copper, 13,000 kg of gold and over 400,000 kg of silver every year, and also produces lead, zinc clinker and sulphuric acid. The Rönnskär plant has a total of approximately 860 employees.

NEW BOLIDEN

Metals for modern life