

From electronic waste to industrial waste – our environmentally friendly and energy-saving recycling contributes to sustainability.

Dr. Franz-Josef Westhoff, Plant Manager



## Kayser Recycling System (KRS)

Kayser Recycling System (KRS) is an integrated and innovative system that brings together under one roof the processing stages of reduction, conversation and mixed tin recovery. The new metallurgical concept of the Kayser Recycling System was developed from the technical concept of a bath furnace, replacing the old shaft furnace system, and involving the recovery of mixed tin in a rotary drum furnace.

In comparison with the old installation, fossil fuel consumption was reduced by 53% per tonne of fed-in raw material. The specific amount of CO<sub>2</sub> generated was also 64% less.

The Kayser Recycling System is suitable not only for traditional recycling materials, such as residues and alloy scrap, but also for modern recycling materials, such as electrical and electronic scrap. It is State of the Art Technology in respect of copper recycling, as well as in terms of environmental protection and energy efficiency.

The process begins with sampling and preparing the material. Electrical and electronic waste is broken up and separated at the material preparation unit. Aluminium and plastics are separated for external recycling. The remaining plastics are then utilized in the first KRS process stage so as to minimize the amount of reducing agents required, e.g. from coke.

The recycling materials are fed into the KRS smelter unit by an enclosed conveyor belt. Oil and oxygen energy is then supplied to the incoming slab, leading to high smelting capacity and rapid metallurgical reactions. The recycling materials undergo a two-stage smelting and conversion process at 1,200° C. The slags from the reducing meltdown are granulated with water and marketed as quality-supervised iron silicate sand. The zinc oxide-containing exhaust gas is transferred to the subsequent cooling and filter installations by means of a heat recovery boiler for separation of the oxide. This zinc-containing KRS oxide product is marketed in the chemical and zinc industries.

The converted copper is transferred in liquid form to the anode furnace through a holding furnace. The tin- and lead-containing converter slags are further processed in a rotary furnace into a mixed tin product (about 40% tin).

Besides the liquid KRS copper, many high copper-content types of copper scrap also enter the anode furnace; these are refined to a copper content of 98.5 – 99%.

During the subsequent electrolysis stage, the anodes are refined to Grade A cathodes with 99.99% copper content. Precious metals such as gold and silver are recovered via the intermediate product anode sludge; these are processed at the Hamburg plant into high-purity gold and silver granules and bars.



Recycling

High increases of efficiency in engines are possible through additional use of copper.

**Savings:  
2,500 kg CO<sub>2</sub>  
per kg  
of Copper**



Company

**Address**  
Aurubis AG  
Kupferstr. 23  
44532 Lünen

**Contact**  
Dr. Franz-Josef Westhoff  
Plant manager  
Tel.: +49 (2306) 108213  
Fax: +49 (2306) 108221  
E-Mail: f.westhoff@aurubis.com

The Initiative

Metals pro Climate is an initiative which presents and highlights the achievements and potential of the NF metals industry.

**Contact**  
Melanie Dillenberg  
Tel.: +49 30 726207-102  
Fax: +49 30 726207-198  
Email: intemann@metalsproclimate.com

## Gallery



South view of the  
Kayser Recycling System



Electronic scrap sampling



Electronic waste



Electronic waste feed conveyor



Company

**Address**  
Aurubis AG  
Kupferstr. 23  
44532 Lünen

**Contact**  
Dr. Franz-Josef Westhoff  
Plant manager  
Tel.: +49 (2306) 108213  
Fax: +49 (2306) 108221  
E-Mail: [f.westhoff@aurubis.com](mailto:f.westhoff@aurubis.com)

The Initiative

Metals pro Climate is an initiative which presents and highlights the achievements and potential of the NF metals industry.

**Contact**  
Melanie Dillenberg  
Tel.: +49 30 726207-102  
Fax: +49 30 726207-198  
Email: [intemann@metalsproclimate.com](mailto:intemann@metalsproclimate.com)