

 **supersort**[®] technology

dhz

RESOURCES FROM WASTE 



«Experts in the recovery of secondary raw material from waste and residues»

About us

DHZ AG

4–5

Business principles

resource mining®
with supersort®technology

6–9

Core activities

Processing / Logistics

10

Our services

Plant development and sales

11

supersort®technology

12

Material flow

13

supersort® and supersort®fine

14-17

Fine processing

18-19

Plant engineering and sales

About us | DHZ AG



DHZ AG is part of the Eberhard Holding AG in Kloten. DHZ planned and built the Häuli landfill and ensures its safe operation, including the aftercare phase. Since 2012, DHZ AG has set new standards in the environmental performance and process efficiency of bottom ash processing with its **supersort[®]technology**.

History



2007 | Green light for the Häuli landfill

After the basic evaluation of the location, the landfill site was taken over and secured, and the landfill planning process was initiated.

2009 | Foundation

DHZ AG was founded in 2009 as a subsidiary of Eberhard Holding AG in Kloten.

2010 - 2012 | Construction of the Häuli landfill

The realisation of the large-scale project started on 19 July 2010. After an intensive and successful construction phase, operations started on 3 January 2012 at the Häuli landfill.

2013 | Recyclable Material Centre and supersort®

The construction of DHZ AG's new Recyclable Material Centre paved the way for the new processing plant for waste incinerator bottom ash, **supersort®**. The commissioning of the plant, which had been developed by the company itself, started in August 2013.

2014 | supersort®fine

In December 2014, supersort® was extended by means of an in-house development in order to process the <3mm material fraction. The fine fraction process is called **supersort®fine** and enables an economic recovery of metals from the fine fraction of bottom ash.

2016 | supersort®metal

Since 2016, the non-ferrous metals mixture from Lufingen, as well as from other suppliers, have been further cleaned and separated with the **supersort®metal** plant.

2018 | supersort®fine pss

Delivery of the first **supersort®fine pss** machine to an external customer for processing <5mm bottom ash.

Plant locations

The headquarters of DHZ AG as well as the **supersort®** and **supersort®fine** plants are located in Lufingen. The **supersort®metal** plant is situated in Oberglatt.



Business principles | resource mining®

Cleanly sorted.

We use innovative technology to recover, clean and sort materials, return recyclable materials to the production cycle and dispose residues in conformity with Swiss law.

Safely deposited.

Our landfills satisfy the highest infrastructural standards and contribute to the protection and preservation of the environment.

Sustainably active.

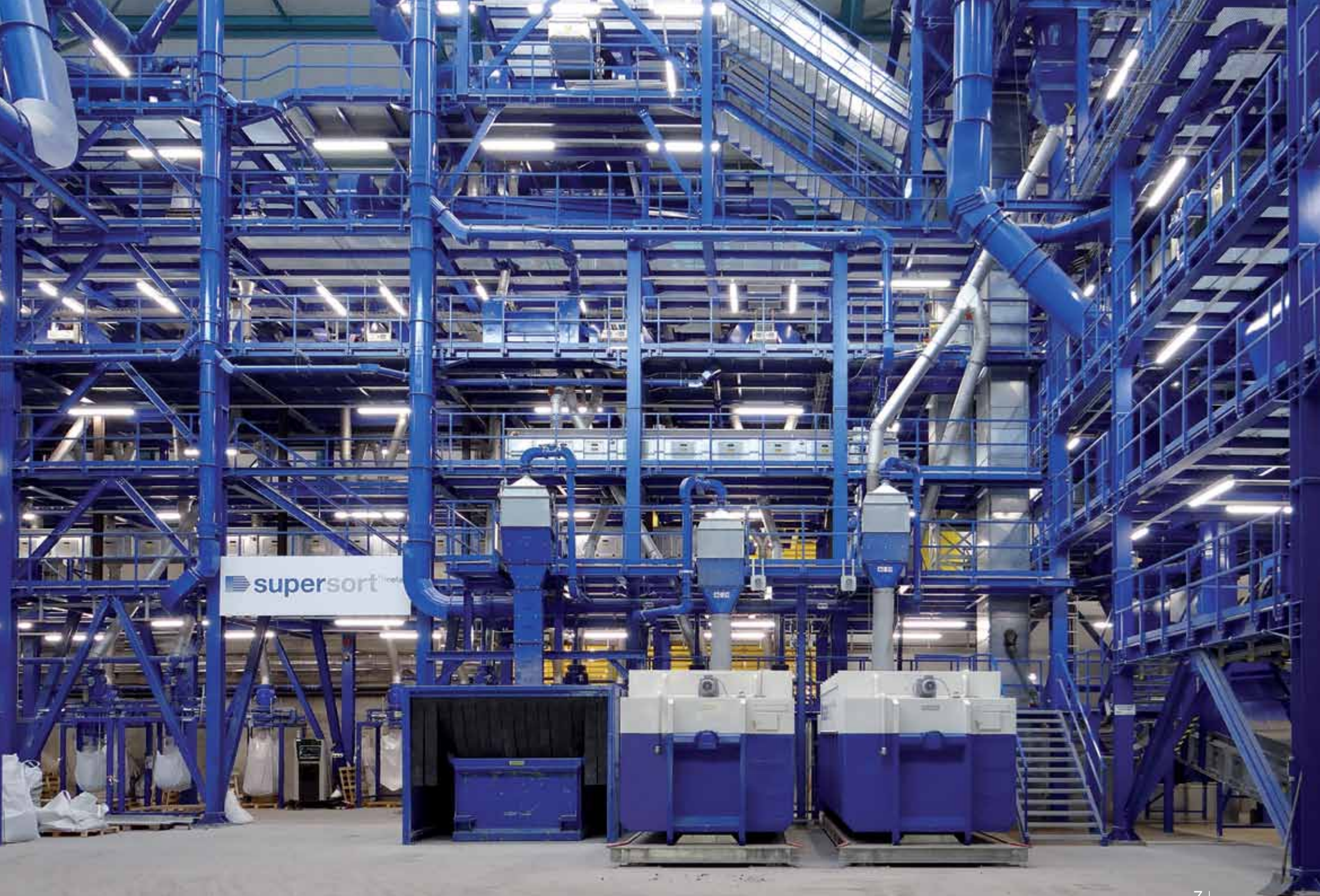
As a pioneer and as a reliable service provider, we treat our business partners with openness and respect. We attach a great deal of importance to long-term relationships, and together we achieve top performance.



resource mining®

By **resource mining®**, we understand as complete as possible a recovery of recyclable materials (such as metals) from municipal and industrial waste. The term

reflects the way we think in material cycles for the protection of our natural resources through consistent recycling.



resource mining® with supersort®technology

Best available techniques

With our **supersort®technology**, the mission of **resource mining®**, an extensive and efficient recovery of metals from incinerator bottom ash can be achieved. The **supersort®technology** not only enables a high degree of metal recovery out of bottom ash but also delivers a high quality of metals. These high-purity metal products can be efficiently further processed and reduce environmental impacts along the whole supply chain of secondary raw materials.

What is incinerator bottom ash?

Every year, 4 million tonnes (2016) of waste is delivered to Switzerland's waste incineration plants. Out of 1 ton of incinerated waste, around 200kg of bottom ash is produced. This results in 750,000 tonnes of waste incinerator bottom ash per year. Bottom ash contains valuable metals which have to be separated before

the residue is deposited. Such residues have to be in conformity with the Federal Ordinance on Avoidance and Disposal of Waste.

A typical metal content in bottom ash is around 13 %. Around 75 % of metals are ferrous (steel scrap) and

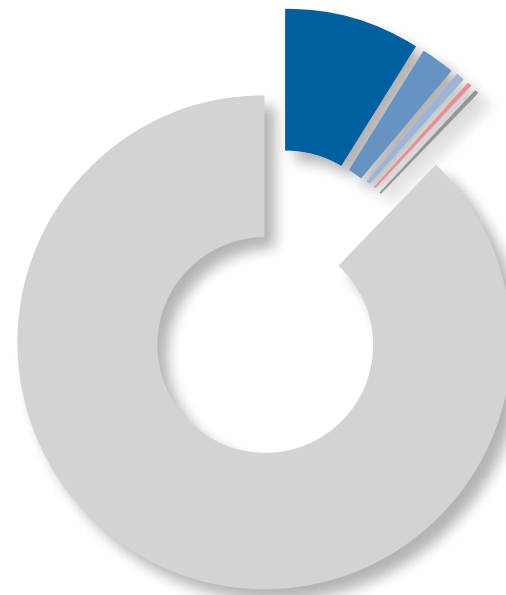
the remains are non-ferrous metals like aluminium or copper. The metal content of bottom ash depends on several factors:

- the type and composition of the burnt waste
- the operating method and type of combustion

Protection of valuable resources

- Metals are a limited resource
- From a global perspective: a growing demand for metals
- Decreasing metal concentrations in metal ores, combined with increasing difficulties in the development of deposits
- Switzerland and Europe have relatively scarce metal deposits, which increases their dependence on regions that are rich in raw materials but in some instances are politically instable

Less transport > less CO₂ > less pollution of water, land and living space in primary mining areas > long-term safeguard of reserves and raw materials



Typical composition

■ Steel scrap	9 %
■ Aluminium	2.2 %
■ Copper	0.6 %
■ Zinc	0.2 %
■ Stainless steel	0.5 %
■ Bottom ash	87.5 %

society

products

waste

secondary materials from
supersort®metal

incinerator

resource
management

 **supersort**® technology

Core activities

Processing



Waste incinerator bottom ash processing

supersort® and **supersort®fine** enable us to process the entire range of waste incinerator bottom ash. It is a dry-mechanical process which separates the metals out of the bottom ash. The separated non-ferrous metal mix is further upgraded with **supersort®metal**.



Fine processing

supersort®fine is used to economically recover metals from the <3mm fraction. The concentration unit reduces the fine fraction of the bottom ash by about 50 %. Eddy current separators concentrate the non-ferrous metals to a metal content of around 50 %.



Non-ferrous metals processing

supersort®metal enables the recovery of metals out of metalliferous waste streams, as well as out of the clean and separate non-ferrous metals from **supersort®** and from other bottom ash recycling plants. In this way, high-quality secondary raw materials such as aluminium and heavy metals can be produced.

Logistics



Logistics concept

You have the option of delivering your material directly to our plants or of commissioning DHZ AG to organise a transport and logistics concept. We also collect the materials from you and organise the necessary formalities together with you.

Our services | Plant development and sales



Patented process



Engineering



supersort[®]fine pss

In cooperation with a Swiss partner, DHZ AG offers the **supersort[®]fine pss** on the market, thus enabling operators of processing plants to efficiently recover metals from the fine fraction of incinerator bottom ash (<5 mm).

Quality management

The main functions of the **supersort[®]laboratory** are input material analysis, process monitoring, product quality control and the support of further plant development.

Research and development

We use our extensive know-how and many years' operational experience for the ongoing further technical development of our plants. It is our declared goal to put the existing potential to even better use.

Engineering services

In cooperation with our long-standing partners, we offer you the following services for your plant: conceptualisation, planning, construction and commissioning of the plant; development of a tailor-made logistics concept.



Annual processing of 120,000 tonnes with the best available techniques (BAT)

The **supersort®technology** is among the most progressive bottom ash processing technologies in Europe. It is based on in-house studies, experience with various recycling technologies and the latest processes in the fields of bottom ash treatment.

In February 2016, the Cantonal Office for Waste, Water, Energy and Air (AWEL), confirmed that **supersort®** and **supersort®fine** plants satisfy BAT standards.

We operate the following plants with the **supersort®technology**:

Location Lufingen

- **supersort®**
- **supersort®fine**

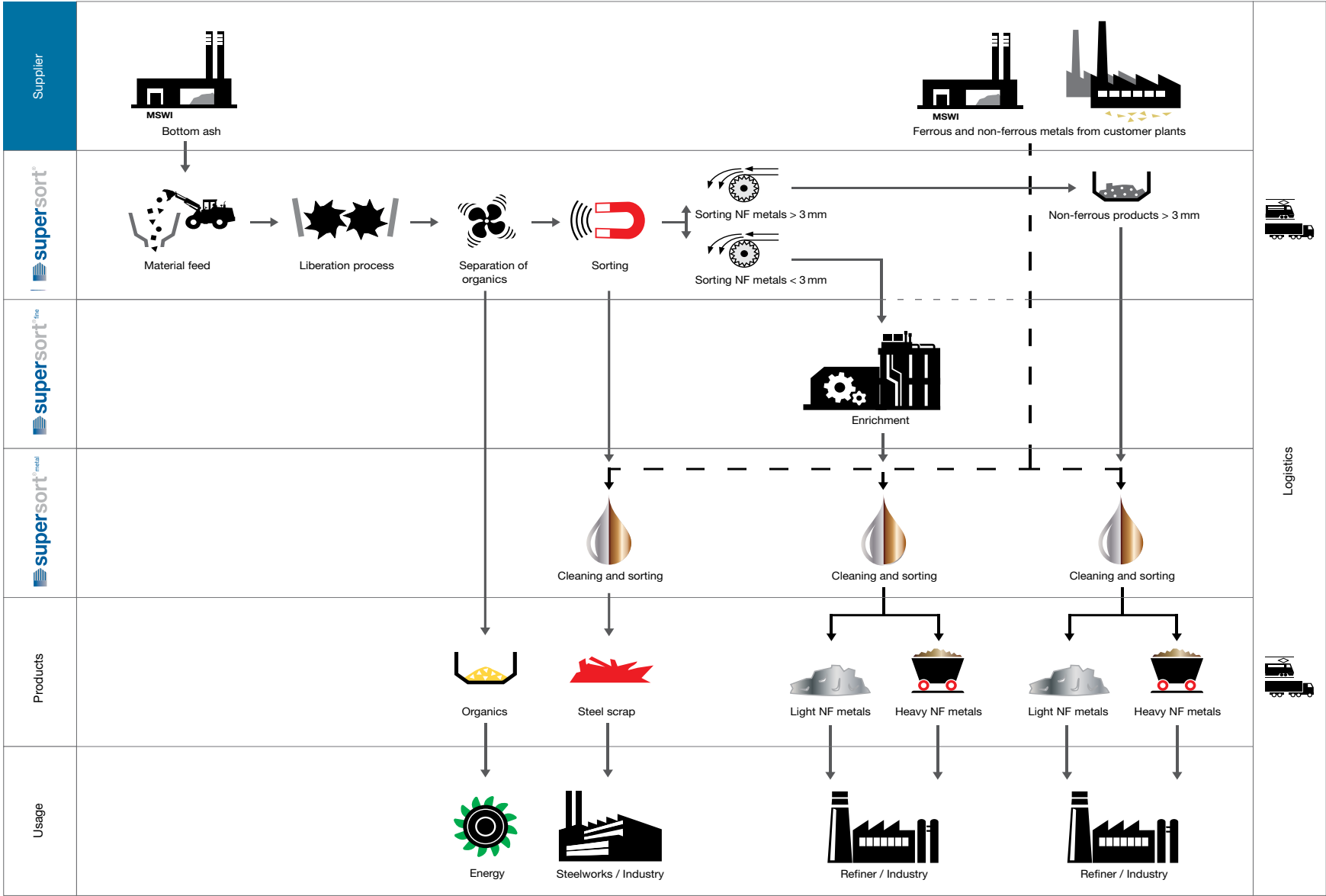
Location Oberglatt

- **supersort®metal**



win³
for you
for society
for the environment

Material flow diagram



supersort[®] and supersort[®]fine

Input material

Besides waste incinerator bottom ash, other metalliferous waste fractions can be processed with **supersort[®]**.



MSWI bottom ash



Other metalliferous wastes

From waste to secondary raw material

With **supersort[®]** all types of bottom ash from incineration plants can be processed in an economical and environmentally friendly way. The process makes use of dry-mechanical methods like screening, crushing and separating metals with magnets and eddy current separators. The Lufingen plant achieves a high yield of valuable metals (steel scrap and non-ferrous metals) while reducing the concentration of metals in the remaining bottom ash. Waste incinerator bottom ash of a grain size of $<3\text{ mm}$ has been processed successfully with the **supersort[®]fine** plant since December 2014. The system, which was developed in-house, enables an economic recovery of metals down to 0.5 mm .



Products of supersort®



Steel scrap



Stainless steel



CU-FE «meatballs»



Organics

Non-ferrous metals



Mix of light and heavy metals from **supersort®**:
coarse fraction ($>3\text{mm}$)



Mix of light and heavy metals from **supersort®fine**:
fine fraction ($<3\text{mm}$)

Cleaning and sorting of these products
with **supersort®metal**



Non-ferrous metals processing

supersort®metal enables us to upgrade a non-ferrous metal mix out of bottom ash and recover metals from shredder residues and from other metalliferous waste streams. After selective crushing, any mineral material is removed from the non-ferrous metals. A screening process and a dry-mechanical separation process divides the non-ferrous metals into light and heavy non-ferrous metal products.

Input



Non-ferrous metals 0-100mm
(from customer facilities)



Other metalliferous wastes



Shredder residues: light and
heavy fractions





Products from supersort[®]metal

A wide variety of grain sizes starting from 0.3 mm are available in the non-ferrous heavy metals and aluminium products.



■ supersort[®]heavy 4–8 mm



■ supersort[®]heavy 0.5–1.8 mm



■ supersort[®]alu 4–12 mm



■ supersort[®]alu 1.8–4 mm

Please do not hesitate to contact us for further information on qualities and prices.

Metal purchase and sale:

Phone +41 43 255 40 30, e-mail info@dhz.ch

Fine processing | Plant engineering and sales

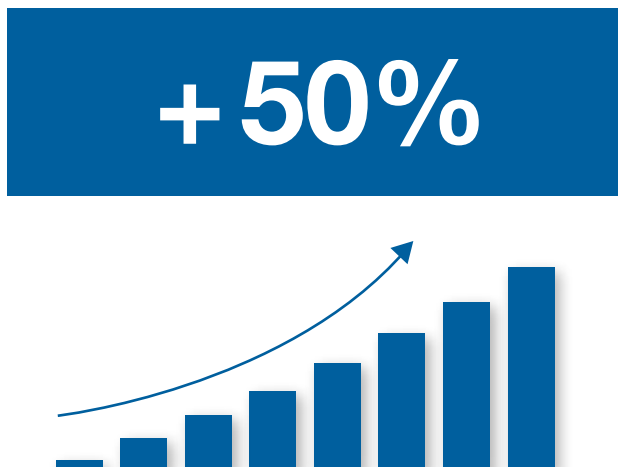


Ready for the future



In the future, an increasing amount of valuable metals like heavy and precious metals will be found in the smaller grain sizes. **supersort®fine pss** enables the economic recovery of these metals down to a grain size of 0.5mm.

Increasing the recovery rate



The fine fraction of bottom ash contains metals which are not usually processed. **supersort®fine pss**, the dry-mechanical process for fine bottom ash, increases the total metal recovery rate significantly.

Innovative technology



The ballistic method enables simultaneous sorting by size and density. It can also classify the material if the material is wet and sticky. The coarser fraction can be efficiently processed further with an eddy current separator to produce a highly valuable non-ferrous metal mix.

Full service provision

Everything from one single partner

In cooperation with a Swiss partner, DHZ AG offers the unique **supersort[®]fine pss** treatment on the market, thus enabling operators of processing plants to efficiently recover metals from the fine fraction of waste incinerator bottom ash. We determine the potential of fine processing for you, assume responsibility for the planning and construction of the new treatment plant and advise you competently and reliably during its operation.

supersort[®]fine pss – the process

- The ballistic process enables simultaneous sorting by density and grain size.
- Large and heavy (metal) particles have a different ballistic trajectory from small and light (mineral) particles.
- A splitter blade separates the material. The result is a coarse fraction enriched with metals and almost free of the finest fraction.
- The coarse fraction is then further concentrated on an eddy current separator. The result is a non-ferrous metal concentrate with a high percentage of heavy and precious metals.



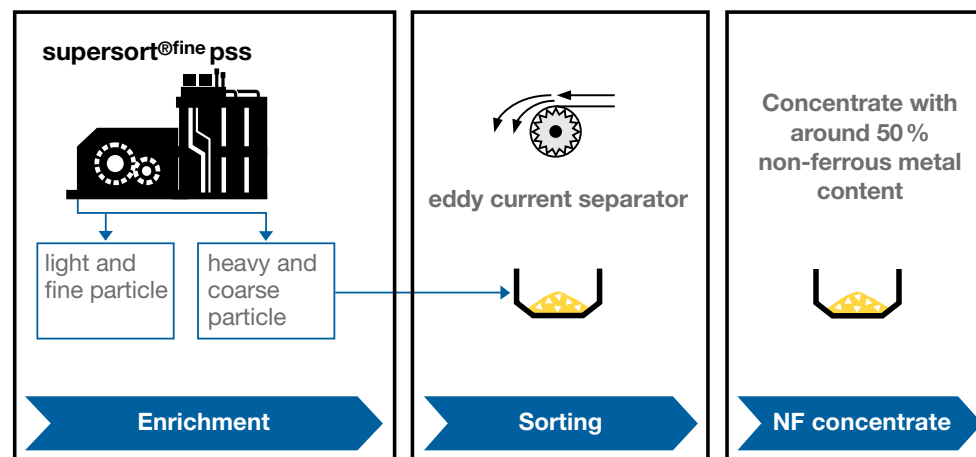
The problems of the finest fraction

- The fine fraction has a high moisture content and is «sticky».
- Fine moist bottom ash can hardly be screened.
- With the conventional eddy current technology, the recovery of non-ferrous metals is limited to particle sizes down to 0.5 mm.
- The <0.5 mm fraction disturbs the separation of coarser particles on eddy current separators.
- Large mass flows require plant components to be designed for high performance with a correspondingly high investment volume.

The classification and removal of this <0.5 mm fraction from the material flow are essential for a successful dry-mechanical recovery of metals out of fine bottom ash.

Advantages of supersort[®]fine pss

- This new process allows for an efficient dry-mechanical recovery of metals.
- Classification of sticky and moist material variably adjustable between 0.5 mm and 5 mm.
- Additional revenue through the recovery of metals, particularly since the fine fraction contains a high proportion of heavy and precious metals.
- This additional metal recycling increases contributions to the protection of the environment through a reduced demand for primary resources.
- Reduction of environmental risk owing to the lower metal content of the processed bottom ash.



For detailed directions:
www.supersort.ch/en

DHZ AG
Deponiestrasse 1
8426 Lufingen-CH

T +41 43 255 40 30
info@dhz.ch

www.supersort.ch

dhz