

# Printed Circuit Boards (PCB) – Mechanical treatment concepts

WEEE KNOW HOW





Pre-shredding and dust exhaust



20%

**Ferrous metals**



10%

**Aluminum**



70%

**Printed circuit boards**

Output-fractions of a concept for treatment of printed circuit boards

## MECHANICAL TREATMENT OF PRINTED CIRCUIT BOARDS

Recovery of precious metals from recycling of electrical and electronic waste is of worldwide increasing importance especially due to decreasing primary occurrence of precious metals and as the consequence thereof the continuously increasing costs at initial recovery. Significant concentrations of precious metals can especially be found in printed circuit boards.

Furthermore, these printed circuit boards also contain usable and marketable ferrous and aluminum fractions, not to be underestimated in percentage. URT is concentrating especially on the topic of printed circuit boards and is offering mechanical treatment concepts with different processes.

## BASIC CONCEPT FOR TREATMENT OF PRINTED CIRCUIT BOARDS

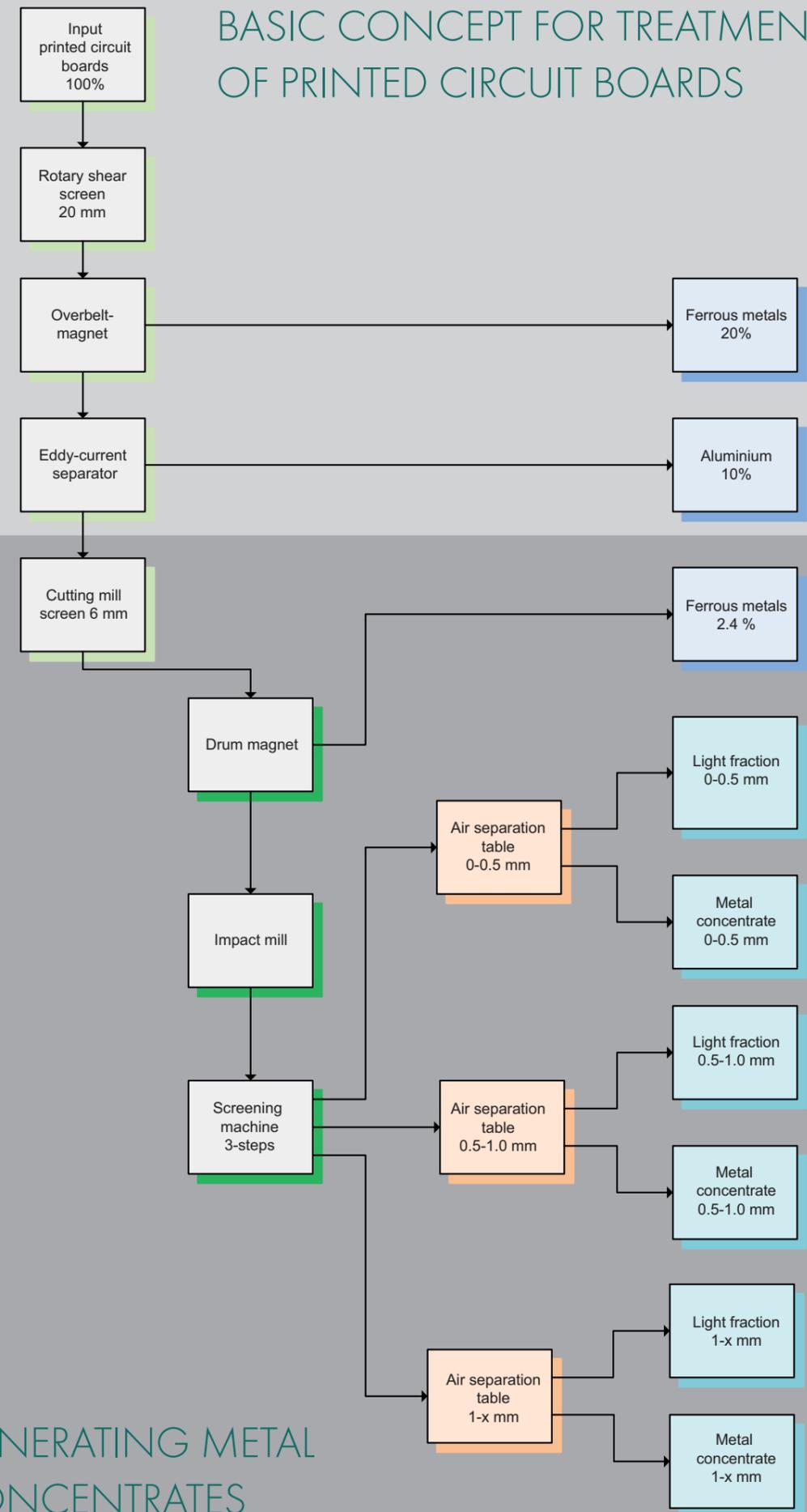
URT Umwelt- und Recyclingtechnik GmbH offers a basic concept that intends to shred the whole printed circuit boards in one step. This will be done with a slowly rotating rotary shear which is producing a granule of approx. 20 mm. With this granule size ferrous metals and aluminum can be separated now.

This represents already 30 % metal which can be sold directly. In comparison with the initial material mass, the remaining residue of printed circuit boards is now containing concentrated precious metals (copper, gold, silver and palladium). Normally these material fractions will be sold to copper smelters.



Basic concept with separation of Al and Fe

## BASIC CONCEPT FOR TREATMENT OF PRINTED CIRCUIT BOARDS



## GENERATING METAL CONCENTRATES

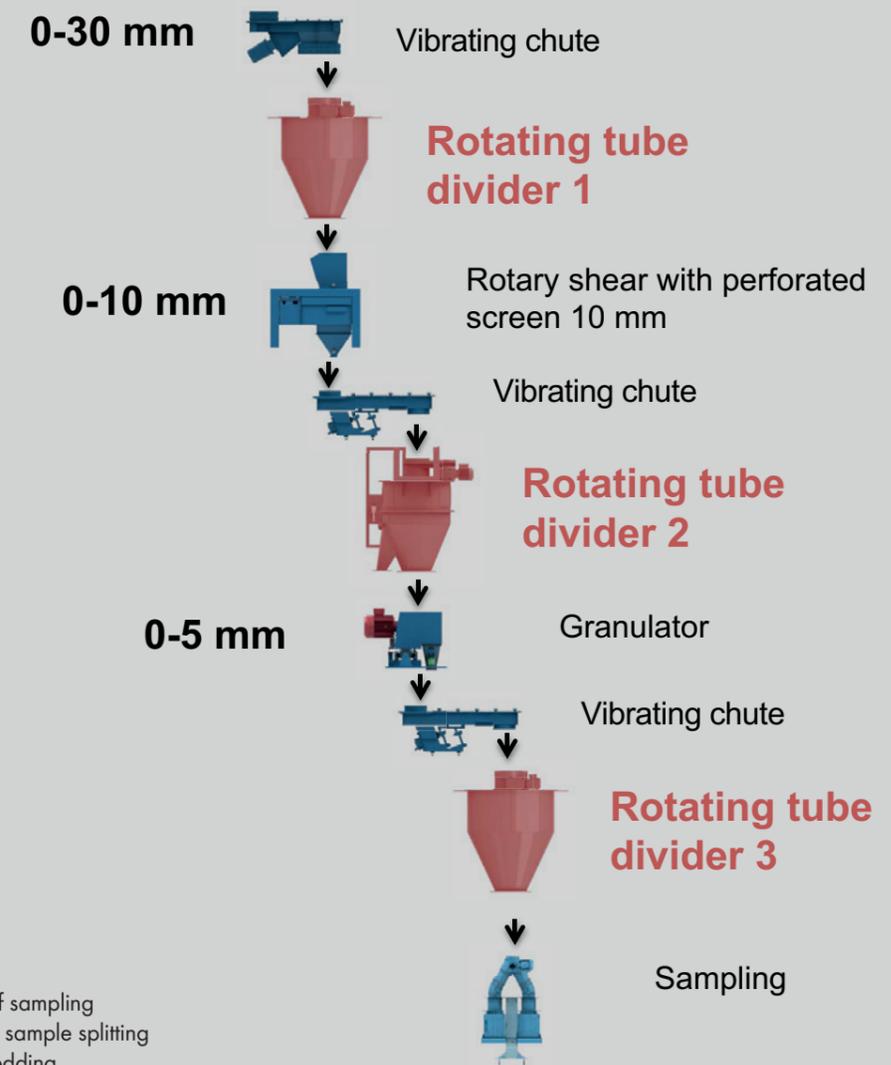
A good material separation will be obtained by further shredding with cutting and impact mills. By means of a screening machine 3 different particle size distributions will be generated. Each particle size spectrum is fed into a downstream density separation stage. The par-

ticular heavy fraction is a metal concentrate consisting of copper and precious metals, which can be melted directly. Copper and precious metals can be recovered by means of downstream arranged electrolysis and hydrometallurgical processes.

## GENERATING METAL CONCENTRATES



Rotating tube divider above sampling tower



Schematic diagram of sampling by means of triplicate sample splitting with intermediate shredding

## PYROLYSIS PLANTS FOR PRINTED CIRCUIT BOARDS

Another technical challenge regarding the treatment of printed circuit boards has already been realized by URT. Pyrolysis plants have been designed which produce metal concentrates in a pyrolysis furnace under exclusion of air. All

organic substances are directed in gaseous form into a post-combustion chamber for being burned. In the further downstream the produced metal concentrate will be treated in melting furnaces.

## SAMPLING AND SAMPLE DEVIDER

For all mentioned methods sampling of printed circuit boards is especially important. For this purpose, URT has developed a process which separates the PCB-fractions by

using sample dividers. Statistically correct samples are the result, even in case of large lot batches, which are then used for material analyses.



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