



High-Performance Hammer Milling for Metal Liberation and Advanced Recycling

Unlocking Valuable Metals from Complex Recycling Materials

Modern recycling operations increasingly process materials that contain valuable metals tightly bonded to plastics, insulation materials, resins, fiberglass, rubber, and other contaminants.

While conventional shredding systems reduce material size, they often leave significant quantities of valuable metals attached to non-metallic components. This limits the efficiency of downstream recovery systems and reduces the overall value of the recovered products.

The TST Overseas Hammer Mill has been specifically designed to address these challenges. By combining high-impact crushing forces with a robust and flexible machine design, the system achieves intensive material liberation while producing ideal feed material for subsequent screening, density separation, air classification, and metal recovery processes.

The Principle of Hammer Milling

The Hammer Mill utilizes a high-speed vertical rotor equipped with free-swinging hammers.

As material enters the milling chamber, the rotating hammers repeatedly impact and accelerate the particles against specially designed milling tracks. The combination of impact forces, particle-to-particle collisions, and interaction with the wear surfaces results in intensive size reduction and material liberation.

Unlike simple shredding systems, the Hammer Mill creates repeated impact events that efficiently break composite materials apart and expose individual material components.

Rotor speed, hammer configuration, milling tracks, and wear components can be adapted to suit specific applications and material characteristics, allowing the system to be optimized for either maximum liberation, throughput, or product quality.

Processing Insulated Copper Wire (ICW)

One of the most common applications for hammer milling is the processing of pre-shredded insulated copper wire.

Even after primary shredding, copper conductors often remain partially attached to plastic insulation. The Hammer Mill efficiently separates these components through intensive impact forces, creating highly liberated metal and plastic fractions.



Typical downstream fractions include:

Fraction	Typical Product
0 – 0.7 mm	Fine copper and plastic concentrates
0.7 – 2.0 mm	Medium copper recovery fractions
2 – 5 mm	High-purity copper and plastic products
5 – 10 mm	Coarse liberated material

The liberated material can subsequently be processed using screening systems and density separation tables to achieve exceptionally high copper recovery rates.

Processing Printed Circuit Boards (PCB)

Printed circuit boards represent one of the most valuable but challenging recycling streams due to the strong bonding between metals, fiberglass, and resins.

The Hammer Mill effectively reduces pre-shredded PCB material while simultaneously liberating:

- Copper
- Aluminium
- Precious metal-bearing particles
- Fiberglass
- Resin components

This improved liberation creates ideal conditions for downstream screening and metal recovery systems, maximizing the recovery of valuable metals from electronic waste.

Application in WEEE Recycling

Waste Electrical and Electronic Equipment (WEEE) contains a complex mixture of metals and non-metallic materials.

The Hammer Mill is frequently used after primary shredding to increase liberation and improve downstream separation efficiency.

Typical materials include:

- Electronic assemblies
- Electric motors
- Connectors
- Cables
- Mixed electronic scrap



- **Non-ferrous metal components**

By increasing liberation before screening and density separation, the Hammer Mill significantly improves recovery rates throughout the recycling process.

Preparing Material for Downstream Separation

The performance of downstream recycling equipment depends heavily on the degree of liberation achieved during size reduction.

Hammer milling improves the efficiency of:

- **Screening machines**
- **Density separation tables**
- **ZigZag air classifiers**
- **Crossflow air separators**
- **Eddy current separators**
- **Sensor-based sorting systems**

Higher liberation results in cleaner products, improved separation efficiency, and increased recovery of valuable metals.

Engineered for Heavy-Duty Recycling Applications

Recycling materials frequently contain abrasive metals, minerals, fiberglass, and other wear-intensive components.

To ensure reliable long-term operation, the Hammer Mill can be configured with:

- **Custom milling tracks**
- **Various hammer designs**
- **Adjustable rotor speeds**
- **Heavy-duty wear protection systems**
- **Specialized motor and rotor configurations**

The large twin-door housing provides excellent accessibility for maintenance and rapid replacement of wear components, minimizing downtime and maximizing plant availability. Continuous temperature monitoring and bearing cooling systems support reliable 24/7 operation.

Key Benefits of the TST Hammer Mill

- **Intensive liberation of composite materials**
- **High recovery rates of valuable metals**
- **Efficient processing of ICW, PCB, and WEEE materials**



- **Flexible configuration for different applications**
- **Robust industrial design**
- **High throughput capacities**
- **Easy maintenance access**
- **Reduced metal losses**
- **Improved downstream separation performance**
- **Reliable continuous operation**

Typical Applications

The Hammer Mill is successfully used in:

- **Insulated Copper Wire (ICW) recycling**
- **Electric motor recycling**
- **Printed circuit board (PCB) processing**
- **WEEE recycling**
- **Non-ferrous metal recovery**
- **Shredder residue processing**
- **Mixed metal concentrates**
- **Cable recycling facilities**

Conclusion

The TST Overseas Hammer Mill provides far more than simple size reduction. Through intensive impact milling and efficient material liberation, it enables recycling operators to maximize metal recovery and improve the performance of downstream separation technologies.

Whether processing insulated copper wire, printed circuit boards, electronic scrap, or complex metal-rich recycling streams, the Hammer Mill delivers the liberation quality required for modern, high-efficiency recycling operations.