



## **Advanced Material Liberation for Maximum Metal Recovery**

### **Increasing Recovery Rates Through Efficient Impact Milling Technology**

**Modern recycling facilities are increasingly challenged by complex composite materials that contain valuable metals tightly bonded to plastics, insulation materials, foils, coatings, and other contaminants.**

**While conventional shredding reduces particle size, it often does not fully liberate individual material components. As a result, valuable metals remain attached to non-metallic materials, reducing separation efficiency and causing losses throughout the recycling process.**

**The ARES Impact Mill from TST Overseas has been specifically developed to solve this challenge. By utilizing high-speed impact forces within a precisely engineered milling chamber, the system achieves efficient liberation of composite materials while preparing them for subsequent screening, density separation, air classification, and metal recovery processes.**

### **The Principle of Impact Milling**

**The Impact Mill operates with a horizontal high-speed rotor and fixed impact plates inside a robust milling chamber.**

**As material enters the machine, particles are accelerated by the rotor and repeatedly impacted against the stationary crushing surfaces. These controlled impact forces selectively break the bonds between different materials while minimizing unnecessary over-grinding.**

**Unlike conventional shredding systems that primarily reduce size, the ARES focuses on material liberation. Metals, plastics, foils, fibers, and other components become separated from one another, creating ideal conditions for downstream recovery technologies.**

**Material feeding can be performed pneumatically or via screw conveyors, while discharge is typically integrated into pneumatic conveying systems. The twin-door design provides excellent access for maintenance and rapid replacement of wear components.**

### **Recovering Valuable Metals from Complex Material Streams**

**The Impact Mill is particularly effective when processing materials that contain valuable metals embedded within non-metallic components.**

**Typical applications include:**

- **Electronic waste (WEEE)**
- **Cable recycling**
- **Metal-plastic composites**
- **Fine non-ferrous concentrates**
- **Battery recycling materials**



- Shredder residues
- Mixed metal recovery streams

In these applications, the primary objective is not simply size reduction but the liberation of valuable metallic particles from surrounding materials to enable efficient downstream separation.

#### **Application Example: Cable Recycling**

Pre-shredded cable material frequently contains copper or aluminium still attached to insulation materials.

Following impact milling, the material can be screened and separated into highly defined fractions, producing liberated metal and plastic streams suitable for density separation and final upgrading.

Typical downstream fractions include:

<b>Metal Fractions</b>	<b>Plastic Fractions</b>
0 – 0.7 mm metals	0 – 0.7 mm plastics
0.7 – 2.0 mm metals	0.7 – 2.0 mm plastics
> 2.0 mm metals	> 2.0 mm plastics

The improved liberation achieved by the impact mill significantly increases metal recovery while reducing valuable metal losses in the plastic fraction.

#### **Application Example: WEEE Processing**

Electronic waste presents one of the most challenging recycling streams due to its highly complex composition.

After pre-shredding, impact milling enables the liberation of:

- Copper particles
- Aluminium particles
- Precious metal bearing fractions
- Plastics
- Fiberglass components
- Composite materials



Typical downstream classification can include:

**Metal Fractions      Plastic Fractions**

**0 – 1.0 mm metals    0 – 1.0 mm plastics**

**1.0 – 3.0 mm metals 1.0 – 3.0 mm plastics**

**> 3.0 mm metals    > 3.0 mm plastics**

These narrowly defined fractions create ideal feed material for density separation tables, air classifiers, and advanced metal recovery systems.

#### **Improving Downstream Separation Efficiency**

One of the greatest benefits of impact milling is its influence on subsequent processing stages.

Proper material liberation significantly improves the performance of:

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

By exposing individual particles and reducing composite material content, the ARES enables higher product purities and increased recovery rates throughout the entire recycling process.

#### **Designed for Demanding Recycling Applications**

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

To ensure long service life and reliable operation, the ARES can be equipped with:

- **HARDOX® wear-resistant components**
- **Replaceable impact plates**
- **Heavy-duty rotor construction**
- **Customized wear protection packages**
- **Application-specific milling configurations**



The twin-door housing design allows fast access to all critical wear parts, minimizing maintenance time and maximizing plant availability.

#### **Key Benefits of the Impact Mill**

- **Efficient liberation of composite materials**
- **Increased metal recovery rates**
- **Improved downstream separation performance**
- **Reduced metal losses**
- **Flexible adaptation to different material streams**
- **High throughput capacities**
- **Robust industrial design**
- **Easy maintenance access**
- **Suitable for cable, WEEE, and metal recycling applications**

#### **Conclusion**

The Impact Mill from TST Overseas is far more than a conventional size reduction machine. By focusing on material liberation rather than simple shredding, it creates the ideal conditions for efficient downstream separation and maximum resource recovery.

Whether processing cables, WEEE, non-ferrous concentrates, or complex recycling materials, the impact mill helps operators increase metal recovery rates, improve product quality, and maximize the profitability of modern recycling operations.