

Electrostatic Separator

An Electrostatic Separator uses electrostatic charge to separate dry liberated particles of differing conductivity. The technology is commonly used in the mineral processing, plastics and recycling industries to separate conducting materials from non-conductors (insulators)

Electrostatic Separation exploits the difference in electrical conductivity between various materials in a feed material to produce a separation. The ability to produce a separation depends on a number of key material characteristics including conductivity, moisture content and size range. In many applications, often due to the fine particle size, the Electrostatic Separator is the only technology that enables a separation (e.g. -2mm granulated cable cable). The technology also replaces less environmentally friendly separation processes such as froth flotation in mineral processing applications.

Separation Control Variables:

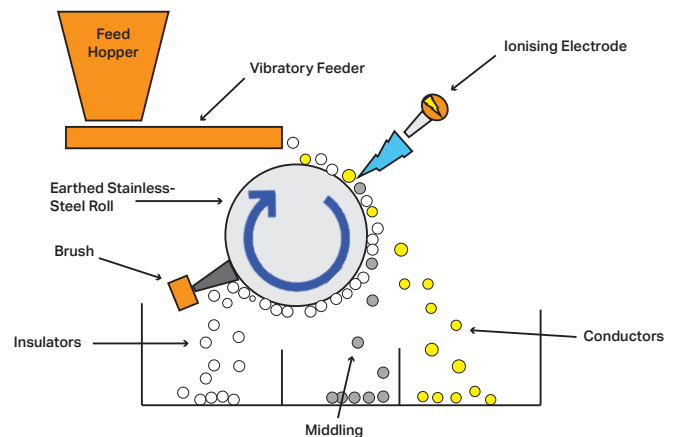
Feed Rate: is controlled using a vibratory feeder- a monolayer of material is preferable for optimum separation efficiency. Typical size ranges of material processed are -2mm, + 106 micron. It is important that the material is dry and free flowing to maximise the efficiency of separation.

Separation Parameters: the degree of conductor/insulator separation can be controlled by adjusting both splitter plate positions, the roll speed and the location of the tungsten wire electrode. The voltage applied to the wire electrode can be varied from 0-40 KeV. Most applications work best in the range 20-30 KeV.

DATA SHEET



Principle of Operation:



Material is fed onto the revolving stainless-steel earthed roll (typically 20-50 rpm) and subjected to a high-tension discharge from a fine tungsten wire electrode. Poor conductors (insulators) remain charged, are pinned by an image force on the roll surface, and then are discharged by the brush. Conductors quickly lose their charge and are thrown off the roll on their natural trajectory.

Recycling Applications:

Electrostatic separators are used on particle size ranges below the effective range of traditional Eddy Current Separators in the recycling industry. They will operate effectively on -2mm, +106 micron size ranges – allowing the processor to granulate or shred to a finer size fraction – thus obtaining better liberation of the valuable metals from the feed.

Typical applications include:

- PET bottle recycling:** Aluminium from PET
- Granulated copper wire processing:** -2mm granulated cable- copper /plastic separation.
- Electronic scrap recovery:** Recovery of valuable metals (Silver, Gold, Palladium) from shredded printed circuit boards.
- Precious metal slag processing:** Recovery of platinum from furnace linings.
- Metal separations:** Copper/Aluminium separation based on differing conductivities.

Mineral Applications:

All minerals have a signature conductivity that is used to separate one mineral phase from another. Typically, electrostatic separation can be combined with magnetic separation to process complex mineral beach sands containing ilmenite, garnet, rutile, quartz and monazite generating a number of saleable mineral products.

Examples of minerals that can be separated are presented in the table below:

Insulators (Pinned on Roll)	Conductors (Thrown from Roll)
Barite	Cassiterite
Corundum	Columbite
Gypsum	Diamond
Magnesite	Galena
Monazite	Hematite
Serpentine	Ilmenite
Sphalerite	Magnetite
Quartz	Rutile
Zircon	Wolframite

Models:

The ElectroStatic Separator is supplied as either a single or double stage system with integrated vibratory feed. Safety interlocks are provided on all entry doors. There are three sizes designed to handle different capacities with feed widths of 500, 1000 and 1500mm. Earthed roll diameter is 350 mm.

Some typical capacities are given below:

Recycling Applications

	tph/metre width of coil
Copper/ Plastic Separation (-2mm)	2-3
Aluminium/ Copper Separation	3-4
WEEE Separation	2-3

Mineral Applications

	tph/metre width of coil
Rutile/ Quartz Separation	1-2
Wolframite/ Quartz Separation	2-3
Monazite/ Rutile Separation	2-3

Client Sample Testing Facility

Bunting has a recycling and mineral processing testing laboratory based in the UK with experienced staff to ensure that the most suitable and cost-effective machinery is recommended for each application. Our testing laboratory houses a range of laboratory equipment, representing smaller scaled versions of our industrial product range allowing accurate scale up to industrial capacities. X-Ray Fluorescence and X-Ray Diffraction analysis are available for chemical assay and mineralogical identification to aid the development of a viable process route for each application.

If you require further information regarding Bunting's range of electrostatic and magnetic separators or wish to have a sample evaluated please contact us.

