Kenny & Co.
Eddy Current
Separator
Specification

EDDY CURRENT SEPARATORS
Theory and practice

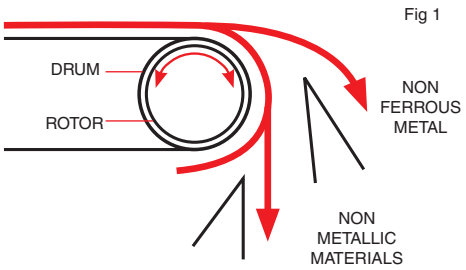

Fig 1

Eddy Current Induction has been known and used for well over 100 years in the design of electric motors, dynamos and transformers.

The principle is that 'an electrical charge is induced into a conductor by changes in magnetic flux cutting through it'. Such changes in magnetic flux can be achieved by moving permanent magnets past a conductor.

The effect of these currents is to induce a secondary magnetic field around the particle; this field reacts with the magnetic field of the rotor, resulting in a combined driving and repelling force which literally ejects the conducting particle from the product stream (see Fig 1).

In the Kenny & Co. Eddy Current Separators, a high speed magnetic rotor is fitted within a nonmetallic drum which travels much more slowly than the rotor so as to produce flux variations at the surface of the drum; the drum also acts as the head pulley of the conveyor carrying the product to be separated (see Fig 2).

As the conducting particles (any metallic objects) are carried by the conveyor over the drum, the magnetic field passing through the particles induces currents into them. Since these particles are of random shapes, it is difficult for the induced current to flow within them in an orderly manner and the currents therefore tend to swirl around within the particles - hence Eddy Current.

It is not possible to provide an 'instant' ECS specification for a given application - most materials being separated are roughly sized,randomly shaped and have variable material mixes; laboratory testing is therefore vital to predict the best type of machine and range of settings for a given range of products.

The following variable factors can influence separation:

- Particle shape
- Particle size
- Particle conductivity

} Non-ferrous metals

- Density
- Moisture content
- Stickiness
- Size distribution
- Fibrous content
- Metallics content

In addition, the performance of the Kenny & Co. ECS can be optimised by varying the following parameters:

- Belt speed
- Rotor speed
- Throughput
- Feed method
- Splitter(s) setting

The magnetic flux and magnetic frequency is determined by the design of the rotor. All of the above factors must be considered before any design recommendation can be produced.

Ferrous removal

Magnets used in the Kenny & Co. ECS impart a strong magnetic pull on ferrous material which can override Eddy Current induction and can result in a violent, vibrating, attractive force which can cause high belt wear. This can be minimised by the use of special belts and wipers to ensure quick discharge of the particles

However, it is preferable to remove ferrous items from the product prior to the ECS.

This can be achieved using a suitable magnetic separator.

In all cases, Kenny & Co. personnel will be able to provide specialist advice on the correct method of dealing with the potentially damaging problem of ferrous contaminants.

Kenny & Co. Eddy Current Separaters
ECO6000

Eddy Current Separaters
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Kenny & Co. practice

The Rotor

Kenny & Co. tests have shown that there is an optimum magnetic frequency at which high separation efficiency is achieved. This requires a high rotor speed, and Kenny & Co. has evolved a successful and safe method for holding the magnet assembly together at these speeds. In fact, Kenny & Co. units have been successfully tested at up to 4000rpm.

The design of the rotor's magnetic circuit - using top quality Rare Earth magnet material -provides both a high flux density and a sharp change in polarity when balanced with field depth.

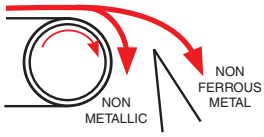
The rotor is concentric with the head drum (see Fig 1) in order to maximise the magnetic effect over the whole of the drum surface; this provides the largest possible magnetic arc. The full rotor does not require change of position within the drum to suit different material types as with the eccentric models.

Splitters

The Kenny & Co. ECS units incorporate a number of different splitter arrangements. As particle sizes reduce, the splitter can be positioned higher up, and closer to the drum. A rear splitter can be fitted to scalp off any weakly magnetic materials from the non-metal if required.

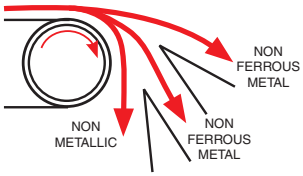
A) Particle size 50mm - 100mm

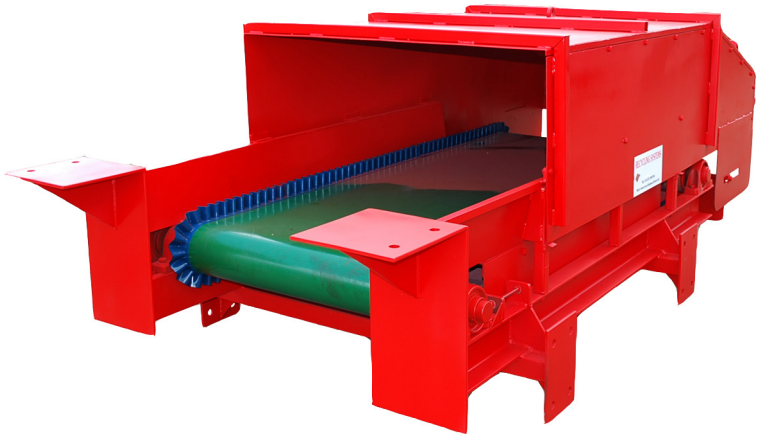
For coarse duties, such as fragmented scrap, a comparatively wide and low splitter is required to allow for pieces to fully separate their trajectories; if higher driving forces are imparted to the non-ferrous metallic particles, the splitter can be positioned higher, giving a cleaner separation process.



B) Particle size 10mm -50mm

For these middle sizes, the splitter settings can be gradually tightened up





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