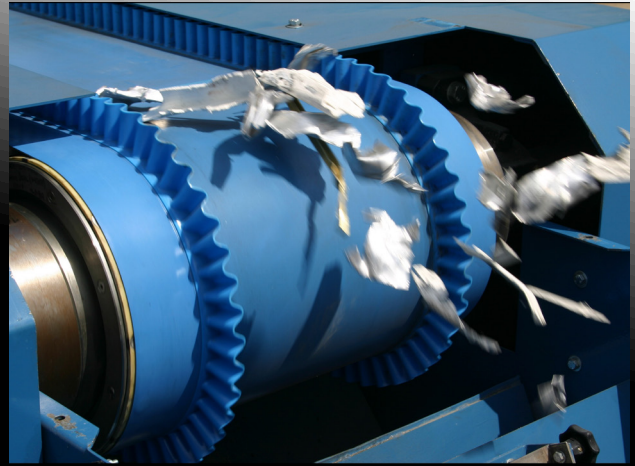




A Bunting® Magnetics Company

EDDY CURRENT SEPARATORS

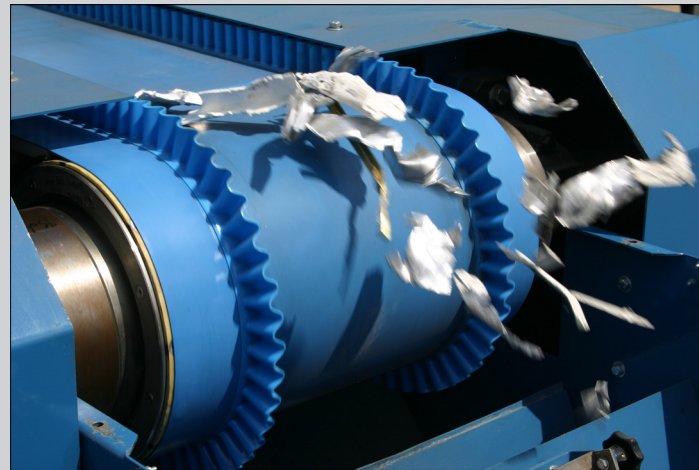


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OPERATING PRINCIPLES

Eddy Current Separators (ECS) are designed to separate non-ferrous conducting metals such as aluminium, copper and magnesium from a given product stream.

The Eddy Current system consists of a short belt conveyor with its drive located at the return end. The ECS rotor, which is fitted at the discharge end of the conveyor, is constructed using a high-intensity rare earth (neodymium iron-boron) magnet system and sits inside a non-metallic rotor cover. The rotor, when spinning at high speeds, induces an electric current into conducting metals. This induced electric current produces a magnetic field, which opposes that of the rotor, repelling non-ferrous metals over a splitter plate. The remaining materials free-fall over the rotor, separating them from the repelled materials.



APPLICATIONS

Eddy Current Separators are increasingly used wherever separation of non-ferrous metals from a product stream can give a more valuable end product. Whether the end use is in recycling, waste reduction, raw material production or any other process where separation would prove beneficial. Typical examples of applications are:

- Separation of non-ferrous metals in auto shredder residue.
- Separation of non-ferrous metals from solid waste incinerator ash.
- Sorting of aluminium beverage cans from dry recyclables.
- Removal of non-ferrous metals from shredded wood.
- Removal of contamination from crushed glass cullet.
- Separation of non-ferrous dross from foundry sand.
- Non-ferrous metal removal in WEEE recycling plants.
- Removal of aluminium components in UPVC window recycling.
- Separation of non-ferrous metals from domestic, industrial and skip waste in Material Recycling Facilities.



COMMON DESIGN FEATURES

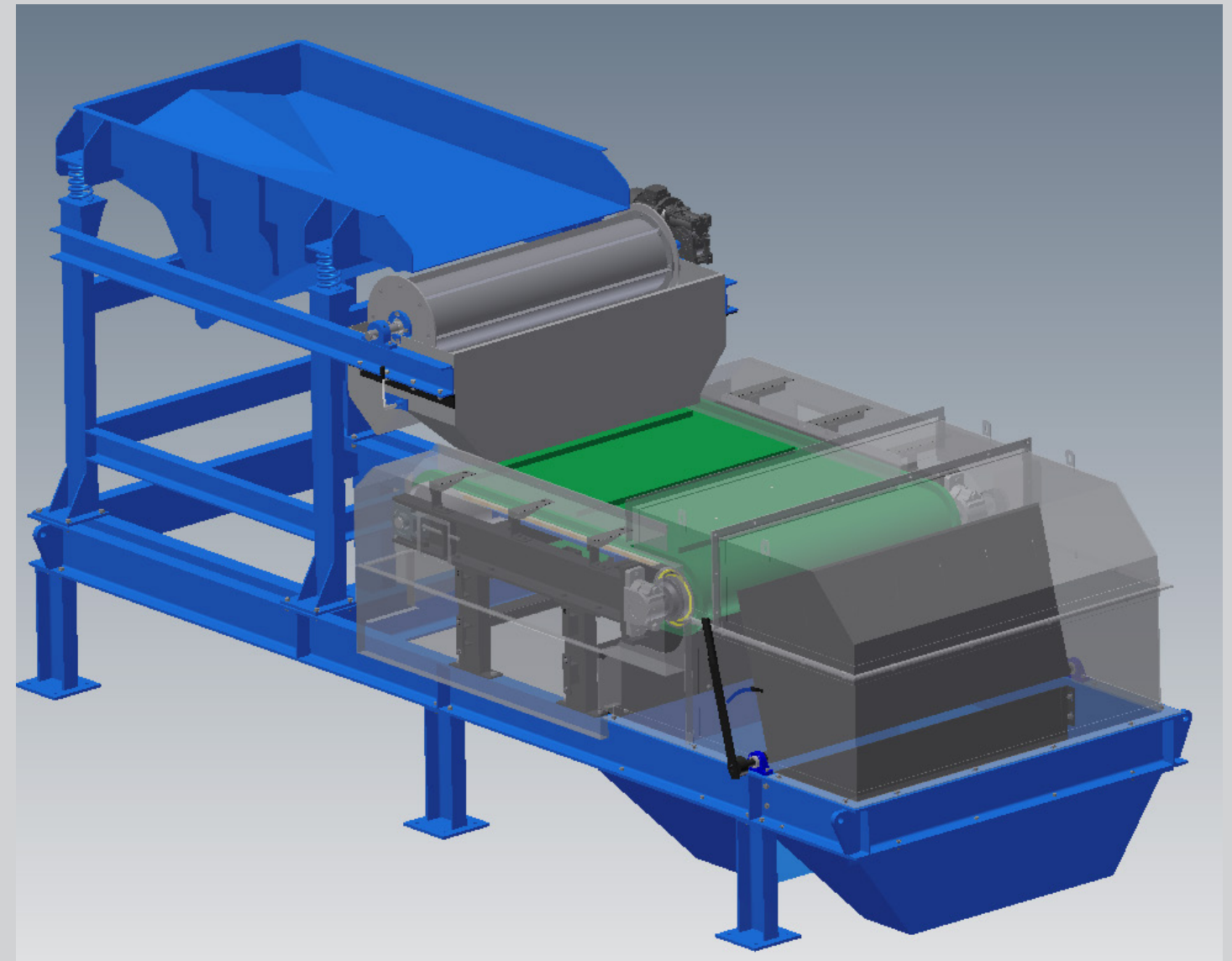
All of the Master Magnets ECS units are built to combine the highest separating ability with a long and trouble-free operating life.

The Master Magnets ECS units are manufactured using a concentric rotor design to allow for maximum separation over the entire outer drum face. This ensures that particles, which may be released through material free fall can also be separated.

The rotors used on the Master Magnets range of ECS units are all dynamically balanced at 3600 RPM to ensure a trouble free operating life, even at the highest operating speeds.

Abrasion resistant PVC belts are used on the ECS units and to further improve the separation capabilities of the Eddy Current, they are specially designed to be very thin, minimising the gap between the product and the rotor. The epoxy resin cover, which protects the rotors magnet system is also specially designed to be as thin as possible, whilst still giving the required strength.

To increase the performance of our ECS units and enable optimum separation, Master Magnets offer optional vibratory feeders for spreading the material evenly across the ECS belt conveyor and producing a 'mono-layer'.



HIGH INTENSITY ECS UNITS

The High Intensity ECS units are specifically designed for the separation of small and difficult particles, which require high repulsive forces. High Intensity Units can be manufactured to operate on belt widths up to 2000mm enabling them to handle very large throughputs. The technical features that are specific to the High Intensity ECS design are as follows:

- **300mm diameter rotor** - The Master Magnets standard ECS units are manufactured with a 300mm diameter rotor constructed using the highest grade of neodymium iron-boron magnets. This provides a very high strength magnetic field for optimum repulsion.
- **24 pole rotor** - To allow for the separation of fine non-ferrous particles, the High Intensity Eddy Current Separators are fitted with 24 pole rotors.
- **Variable rotor and belt speeds** - The High Intensity ECS has variable rotor and belt speed features to allow customers to tailor their units in order to achieve specific separation requirements.
- **Belt change jacks** - Belt changes can be a time consuming and physically difficult task to carry out. In order to make belt changes much easier, High Intensity ECS units can be fitted with a hydraulic jacking system. To further assist clients during belt changes, the High Intensity ECS units have also been designed with hinged frames.

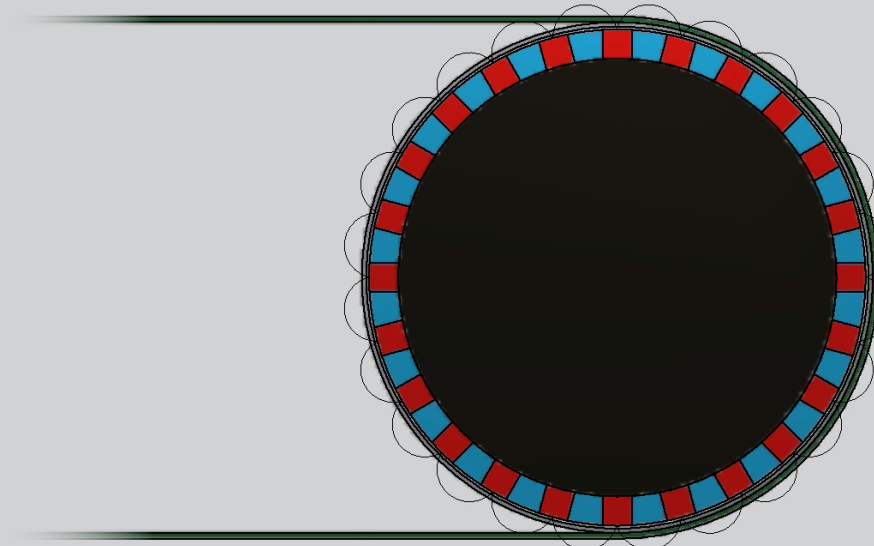


EXCENTRIC EDDY CURRENT SEPARATORS

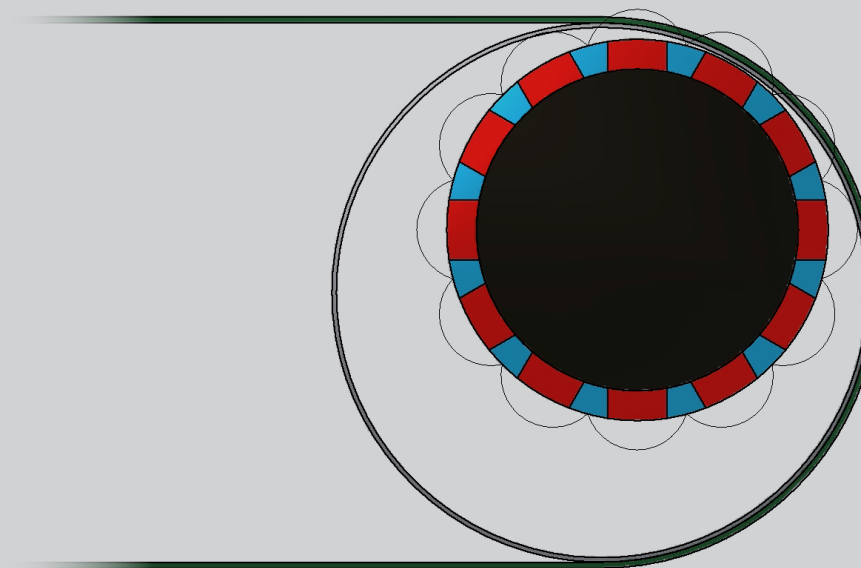
For applications that require separation of fine non-ferrous particles, Master Magnets manufacture an 'Eccentric' ECS rotor. The specification and characteristics of this rotor arrangement allow for optimum separation of smaller particles such as shredded printed circuit boards and fine glass cullet.

Concentric and Eccentric Rotor Design

- **Concentric** rotors consist of an alternating pole Rare Earth magnet system, which completely fills the space available within the separation rotor drum. The magnet system rotates at high speed within a few millimetres of the outer shell surface generating very high 'eddy currents' on the surface resulting in very high repulsive forces.



- **Eccentric** rotors differ in that the magnet system is of a smaller diameter and is located in an eccentric position to the outer rotor drum. The magnet system is positioned close to the surface where the conveyed feed material is leaving the rotor due to its natural trajectory. This design gives an efficient separation but leaves a 'dead' magnetic area at the bottom of the rotor so that any attracted ferrous falls away extending conveyor belt life.



ECS 'R' TYPE

Many ECS applications involve high throughput rates that can only be handled by the large High intensity units due to their belt widths. If however, applications do not require the separation capabilities of the larger and higher specification units, then purchasing a machine of this type for its belt width alone, would not be cost effective.

To eliminate this problem, Master Magnets has designed the ECS 'R' Type. The new 'R' Type fits into the Master Magnets ECS range between the Can Sorter and the High Intensity ECS units, incorporating features of both machines. Specific features of the 'R' Type ECS include:

- **High throughput capabilities** - The 'R' Type has a rotor diameter of 190mm and can be manufactured to fit belt widths of up to 1250mm.
- **Variable rotor and belt control** - The 'R' Type ECS has variable rotor controls to allow customers to set the rotor at the correct speed for meeting their specific separation requirements.
- **12 pole rotor** - A 12 pole rotor is used on the ECS 'R' Type. The 12-pole rotor is capable of achieving a better separation than the 6 pole rotor used on the Can Sorter.



THE CAN SORTER

The Can Sorter is specifically designed for the separation of non-ferrous beverage cans from dry recyclable applications. The Can Sorter ECS is a low-cost alternative to larger Eddy Current units when applications do not require higher specification machines. Technical features that are specific to the Can Sorter units are as follows:

- **Simplistic and cost effective design** - The Can Sorter has a 122mm diameter, 6-pole rotor and is available with an effective width of up to 600mm. The Can Sorter was designed to be a more compact and simplistic unit than the larger machines in the range, whilst still providing efficient separation of aluminium cans.
- **Pre-set belt and rotor Speeds** - The belt and rotor speeds, which are usually variable on standard ECS units, are pre-set on the Can Sorter models to give optimum can separation.



OPTIONAL EXTRAS

Ferrous materials can sometimes get caught between the rotor and the belt, causing substantial damage to the rotor cover. The key to avoiding this type of damage is to remove the fine ferrous particles present in the product stream. Master Magnets often advise that this is done by installing a Rare Earth Drum Magnet.

Located immediately after the Vibratory Feeder, the Rare Earth Drum Magnet is constructed using the highest grade of Neodymium Iron Boron material to ensure optimum ferrous extraction. The non-ferrous and non-metallic materials that are not influenced by the Drum Magnet will cascade over the drum surface and continue their normal trajectory onto the ECS conveyor.



Master Magnets can supply complete 'turn key' plants to meet specific customer requirements. The plants can include in-feed conveyors, diverter chutes and additional magnetic separation equipment such as Overband Separators.

Master Magnets is able to provide supports to ground level should they be required. Custom designed walkways can also be provided for around the ECS unit to allow for greater access to the machine and its components.



ROTOR REPAIR SERVICES

The high powered magnetic rotor is the heart of the Eddy Current Separator and its maintenance and servicing is key to ensuring a long and trouble-free service life.

Master Magnets provides a first class rotor repair and refurbishment service, which can be carried out on rotors originally supplied by alternative manufacturers.





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