MASTERMAG

BULLET SEPARATOR

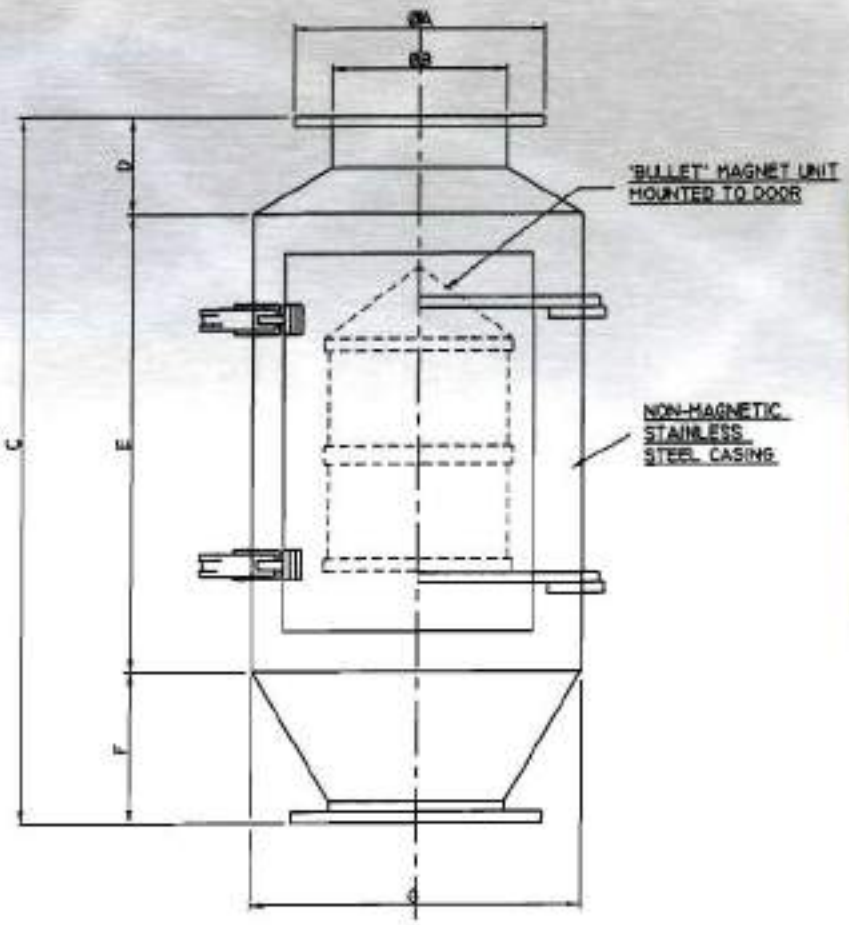
The Bullet Separator is designed for installation in vertical, or near vertical pipelines carrying grain or similar free flowing granular products. It is the ideal solution for extracting iron particles etc. from flour, grain, plastic granules and similar products being conveyed in ducted systems.

The bullet magnet system consists of a circular/conical core packed with everlasting, powerful 'strontium ferrite' or 'rare earth' magnet material, protected by non-magnetic stainless steel rings and fitted into a robust stainless steel trunking. As material flows over the magnetic bullet, any ferrous particles are attracted to the highly magnetic surface and securely held in position. Guide strips on the housing deflect material directly on to the bullet surface. Flanges are provided at inlet and outlet for connection into clients pipe work.

Quick and Easy Cleaning

The bullet separator has been specifically designed to reduced 'downtime'. The bullet is mounted to the trunking door, which can be opened using quick-action catches allowing it to be wiped clean in seconds, causing only minimal disruption to production. The Master Magnets Bullet Separator can also fit into pressurised ductwork, bringing significant benefits, including higher throughput (always consult Master Magnets first).

Bullet Design



Throughput based on the bulk density of 0.8 tonne/m³

TYPE	A	B	C	D	E	F	G	THROUGHPUT (TONNES/HR)	WEIGHT
MM 100	160	100	570	70	370	130	225	7	30
MM 125	185	125	680	100	400	180	230	15	40
MM 150	210	150	680	100	430	150	270	25	50
MM 200	286	200	790	100	520	170	375	50	90
MM 250	336	250	950	100	580	270	425	75	145
MM 300	386	300	1000	100	600	300	475	100	210
MM 400	486	400	1100	100	700	300	620	150	350
MM 500	586	500	1200	100	780	320	780	200	490

Master Magnets have over twenty five years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858 Fax: +44 (0) 1527 65868 Email: info@mastermagnets.co.uk Web: www.mastermagnets.com

MASTERMAG

MASTERMAG

A Bunting Magnetics Company

CERAMICS PROCESSING INDUSTRY GUIDE

www.mastermagnets.com

The production of fine, white ceramics requires the removal of iron contamination from the raw materials. Master Magnets manufacture a comprehensive range of magnetic separation equipment separate tramp and fine iron from the product. Iron contamination can be naturally present in raw material or can be

HIGH INTENSITY FILTERS

Filters incorporate a powerful electro magnetic coil, which surrounds a matrix. The filter is used for the continuous separation of fine paramagnetic contamination from raw ceramic material slips and glazes.

Filters can be designed to produce very high gauss intensities within the matrix for extremely high purity separation. Electro filters are fitted with self cleaning auto backflush systems for continuous operation with adjustable magnetic cleaning cycle.

WIRE WRAP HIGH INTENSITY DRUM MAGNET

Constructed in the same way as a Rare Earth Drum Separator, the Wire Wrap Drum Magnet utilises a Neodymium Iron Boron magnet system, however the outer drum cover is wire wrapped in a unique way, which results in a much enhanced magnetic intensity on the drum surface. This is ideal for free flowing powder applications where the ferrous particles are very small or paramagnetic, such as quartz, fine sand, or ceramic powder processing.

INDUCED ROLL SEPARATORS

High capacity separators for the concentration of finely sized paramagnetic ores and for the purification of non-metallic minerals.

Induced Roll Separators utilise the magnetic induction of rolls via powerful electromagnets to treat a variety of feed material. Single and multiroll arrangements are available, giving both the magnetic and non-magnetic fractions a 'double pass' for optimum purity.

RARE EARTH DRUMS

Constructed with a core of Neodymium Iron Boron, Rare Earth Drums are used where extremely high magnetic intensities are required on the face of the drum. Suitable for the treatment of fine ferromagnetic and paramagnetic materials.

Rare Earth Drums can be fitted into totally closed housings where product must be kept free from external contamination. The drums can also be supplied with Vibratory Feeders to ensure an even spread of material is presented to the drum surface.

MASTEROLL RARE EARTH ROLLS

Powerful Neodymium Iron Boron (Rare Earth) magnetic rolls suitable for the processing of fine powders.

Masterolls are available in single, double or triple roll configurations with auto belt tracking, enclosed guarding and variable speed belts and rolls.

Applications include the removal of paramagnetic particles from quartz, feldspar and other dry ceramic minerals.

MASTERTRAP SEPARATORS

The Mastertrap is a permanent magnetic separator for the extraction of fine iron from wet or viscous product conveyed by pipeline.

Incorporating a series of high-intensity rare earth tubes, the unit is installed into existing pipelines as an effective means of magnetic protection.

Manufactured from stainless steel complete with flanges or threaded ends and available with water jacket for temperature regulation.

introduced through the process lines. The Master Magnets range of separators below can be installed at several points in the process over conveyors and chutes, through pipelines and in the final stages of pre-firing production.

GRID MAGNETS

Comprising of high-intensity rare earth magnetic tubes, magnetic grids are single or multibank racks for installations in hoppers, chutes and ducts.

Grids are available in a range of housings, with drawer openings for easy cleaning, or as self cleaning pneumatic units. Single Tubes are also available for product testing.

SUSPENSION MAGNETS

Suspension Magnets are designed for the extraction of occasional tramp iron from deep product burdens. Depending on the application requirements, the Mastermag Suspension Magnets are available with permanent magnet systems or can be supplied with an air or oil cooled electro magnet system.

PLATE MAGNETS

Plate Magnets are an inexpensive form of magnetic protection against occasional tramp iron contamination. Available in a range of housings and with Ferrite or high intensity Rare Earth magnetic material. Plate Magnets can be configured into 'Deep Reach' or 'Diagonal Leg' housings for deeper product burdens.

OVERBAND MAGNETS

Overband Magnets allow the continuous separation of general tramp iron from raw ceramic product. The unit comprises of either a permanent or electromagnetic core, with a revolving self-cleaning belt, ensuring low maintenance operation.

BULLET MAGNETS

The Bullet separator is a permanent magnetic separator for use in gravity feed and pressurised pipeline systems.

Material flows over the internal "bullet" system, with any extracted tramp iron being held firmly in place, whilst clean product flows undisturbed.

The Bullet Magnet is available with a high intensity rare earth magnetic system for fine iron removal or can be supplied with a Ferrite magnet system for general tramp metals.

PULLEY MAGNETS

Installed as the head pulley in belt conveyors for the continuous extraction of iron contamination. Magnetic Head Pulleys are designed for removing tramp ferrous metals from shallow burden depths of feed material. The 360° magnet system retains extracted iron, discharging it behind the centre line of the pulley, whilst clean product follows its natural trajectory.

LABORATORY SAMPLE TESTING SERVICE

To arrive at the best separation criteria, Master Magnets uses a fully equipped laboratory for material testing to ensure optimum equipment selection.

Customers are invited to submit samples for testing and evaluating, to ensure that separation performance can be measured, with all of the results being submitted for the clients approval.

Initial trials are normally carried out free of charge and customers are encouraged, if practicable, to participate in the testing and processing procedure.

In addition, Master Magnets have established a working association with the Minerals Engineering Sections of the University of Birmingham Chemical Engineering Department. This link provides access to an extensive range of mineral processing facilities and additional expertise.

LABORATORY SCALE EQUIPMENT

The Master Magnets range of separation equipment can be manufactured and supplied to laboratory scale for small batch processing.

This allows clients to cost-effectively utilise the Master Magnets separation technologies, should they only be required for material testing purposes.

Magnetic Separators that have been previously supplied to laboratories include induced rolls, alternating pole drums, isodynamic separators, wet high intensity separators and wet drums.

METAL DETECTORS AND VIBRATORY FEEDERS

To complement the range of magnetic separators, Master Magnets offers a full range of metal detectors and vibratory feeders.

For the transportation and feeding of materials, vibratory feeders can be supplied as single units or integrated into magnetic separators.

Where extremely high product purity is required, Master Magnets also offers a range of high sensitivity metal detectors as additional protection against metal contamination.

MASTERMAG

Master Magnets
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA
E-mail: info@mastermagnets.co.uk Tel: +44 (0)1527 65858 Fax: +44 (0)1527 65868
www.mastermagnets.com

MASTERMAG

MASTER MAGNETS

PERMANENT AND ELECTRO DRUM SEPARATORS

www.mastermagnets.com

MAGNETIC DRUM SEPARATORS

Magnetic Drum Separators are designed for the continuous extraction of iron from material being fed uniformly onto the face of the drum.

Principal of Operation

Magnetic Drums are constructed with a 180° stationary magnet system, around which a cover revolves. Material is fed onto the drum cover at the leading point of the magnet section. Magnetics will adhere to the drum cover as it revolves around the magnet system and will be discharged behind the normal trajectory, assisted by the axial wiper bars after leaving the magnetic field. Non-magnetic materials will fall forward following their normal trajectory.

PERMANENT MAGNETIC DRUMS

Permanent Drums are built using fully stabilised non-deteriorating strontium ferrite permanent magnets which do not require a power source. The magnets are specifically designed to concentrate all flux at the peak of separation, providing a separator that works constantly at maximum efficiency and is virtually maintenance free.

In certain size ranges, Permanent and Electro Drums have comparable performance and can provide very similar levels of separation. Permanent Drums are generally available at a lower cost than Electro models and are more efficient in the smaller size ranges.

Typical applications of Permanent Drums include the separation of steel swarf from aluminium and for the removal of ferrous contaminants from shredded wood and glass cullet.

PERMANENT & ELECTRO DRUM SEPARATORS

ELECTRO MAGNETIC DRUMS

With larger drums, the magnet unit is usually electro type with the coil being wound with insulted aluminium wire. Electro Drums are available in diameter sizes of up to 72 inches (1830mm).

For the large scale processing of material, Master Magnets manufacture a range of Electro Fragmentiser and Slag Drums for special applications.

Fragmentiser Drums are heavy duty alternating pole drums suitable for the reclamation of fragmentised metals in applications such as municipal refuse and vehicle recycling stations. The alternating pole design allows entrapped metals to flip on the face of the drum resulting in cleaner separated ferrous product.

Slag Drums are powerful radial pole drums suitable for the reclamation of slag in the production of steel. The pole design allows the maximum entrapment of metals and the highest levels of separation.

RARE EARTH MAGNETIC DRUMS

Constructed with a core of Neodymium Iron Boron, Rare Earth Drums are used where high intensities are required on the face of the drum in order to achieve separation requirements.

Rare Earth Drums are suitable for the treatment of ferromagnetic materials. Magnetic lines of flux are concentrated in each internal pole, creating a very high-gradient magnetic field. For more extreme applications, Master Magnets can offer Rare Earth Drums that are constructed with wire wrapping to further enhance the magnets intensity.

As well as standard sizes, drums are available bespoke to suit a customers specific requirements and can also be fitted into totally enclosed surroundings (see over).

TOTALLY ENCLOSED DRUMS

Where product needs to be kept free from external contamination or where any dust given off from processed material needs to be kept within the system, drums can be supplied in fabricated housings.

Housings are manufactured in robust mild steel or stainless steel. Inspection covers, aspirators and divider plates are provided as standard.

HIGH SPEED MAGNETIC DRUMS

High Speed Permanent Drums are designed to suit specific application requirements and are suitable for the dry separation of highly magnetic ores such as iron ores, nickel ores (magnetite), roasted ilmenite and similar.

To suit a customer's specific application, the number of magnetic poles, pole configuration, magnetic intensity, magnet arc, and drum shell peripheral speed are all specified.

The drum is installed within a robust mild steel totally enclosed housing. The enclosure is provided with inspection covers, feed hopper, product divider plates and aspirators for dust extraction all as standard.

The range incorporates Magnetic Drums of 36" (915mm), 48" (1067mm) and 48" (1219mm) diameters, varying from 36" (915mm) to 120" (3048mm) effective magnetic widths.

APPLICATIONS OF MAGNETIC DRUMS

Magnetic Drums have cross industry applications and are generally regarded as one of the most effective forms of magnetic separation.

During operation, material is fed directly onto the face of the magnet. The proximity of the material to the magnet means that separation is carried in optimum conditions.

Drums also have the advantage of a longer service life than other types of separator. Replaceable drum wear covers are constructed from manganese or stainless steel and have a longer life than other wear parts such as belting, when handling abrasive materials.

Drums are suited to any continuous processing of material; from the separation of paramagnetics from minerals and powders, to the recovery of ferrous metals from fragmentised end of life vehicles and refuse reclamation.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for their high performance and reliable operations.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burrs Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

MASTERMAG

ECCENTRIC
EDDY CURRENT SEPARATORS

Master Magnets have recently extended their range of Eddy Current Separators, which now includes a unit that incorporates an Eccentric rotor design.

Previously the Master Magnets range of Eddy Current Separators consisted of three different units, all of which incorporated concentric rotors designed to suit varied application requirements.

The Can Sorter:

Specifically designed for the separation of aluminium beverage cans from dry recyclables.

The 'R' Type:

The 'R' Type is Master Magnets mid-range ECS unit, which has been developed to handle applications that involve high throughput rates of well liberated dry recycled materials with a lump size in excess of 30mm.

High Intensity ECS units:

The High Intensity ECS is the most powerful unit in the Mastermag range and is designed for processing materials containing particularly small non-ferrous particles of which require extremely high repulsive forces to ensure efficient separation.

www.mastermagnets.com

THE ECCENTRIC ROTOR RANGE

The new addition to the Master Magnets ECS range is the Eccentric Rotor Design which is advantageous in applications where it is difficult to extract fine or entrapped iron from the feed material with the use of conventional magnets. In these applications excessive belt wear can be experienced due to small pieces of ferrous material being attracted to the magnetic rotor and being 'excited' by the eddy current forces and becoming very hot, once in this state serious damage can be caused to the belt. This new addition to the range will enable Master Magnets to supply a wider selection of separators resulting in the most cost effective and efficient unit for the customer's specific application.

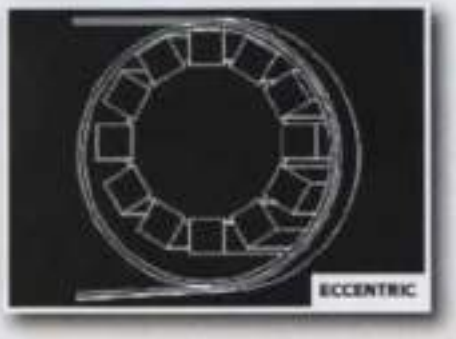
CONCENTRIC AND ECCENTRIC ROTOR DESIGN

CONCENTRIC

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

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.



Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

MASTERMAG

A Bunting Magnetics Company

EDDY CURRENT SEPARATORS

www.mastermagnets.com

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 city waste in Material Recycling Facilities.

COMMON DESIGN FEATURES

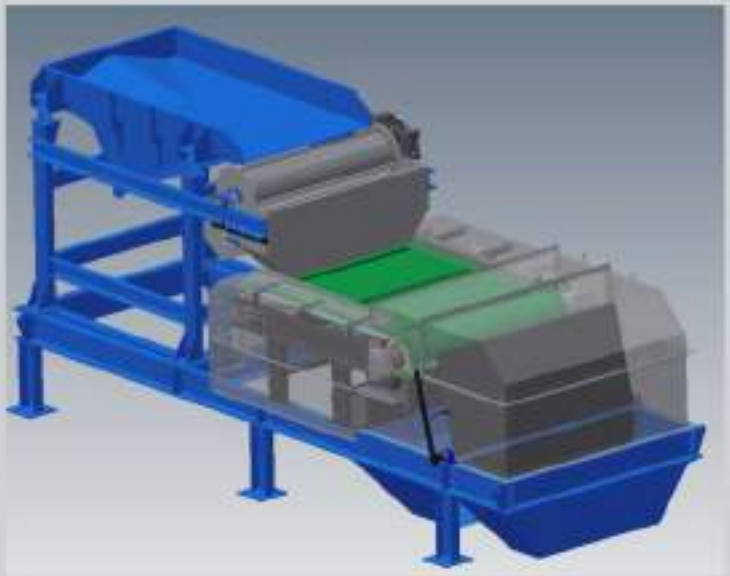
All of the Master Magnets ECS units are built to combine the highest separating ability with a long and trouble-free operating life.

The Master Magnets ECS units are manufactured using a concurrent 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 provide 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:

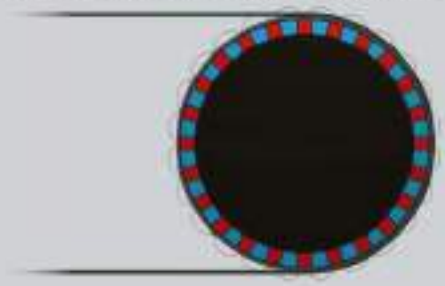
- **300mm diameter rotor** - The Master Magnets standard ECS units are manufactured with a 300mm diameter rotor constructed using the highest grade of neodymium iron boron magnets. This provides a very high strength magnetic field for optimum repulsion.
- **24 pole rotor** - To allow for the separation 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...

ECCENTRIC EDDY CURRENT SEPARATORS

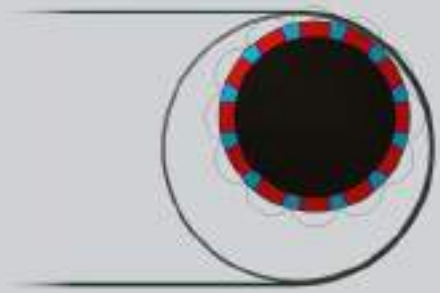
For applications that require separation of fine non-ferrous particles, Master Magnets manufacture an 'Eccentric' ECS rotor. The specification and characteristics of this rotor arrangement allow for optimum separation of smaller particles such as shredded printed circuit boards and fine glass cullet.

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 larger High Intensity units due to their belt widths. 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 193mm and can be manufactured to fit belt widths of up to 1830mm.
- **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 8 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 where 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, 8 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 to ensure the ECS can 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.

Master Magnets

Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA
E-mail: info@mastermagnets.co.uk Tel: +44 (0)1527 65858 Fax: +44 (0)1527 65868
www.mastermagnets.com

MASTERMAG

A Bunting Magnetics Company

MASTERMAG HIGH INTENSITY ELECTRO MAGNETIC FILTERS

www.mastermagnets.com

INTRODUCTION

The Mastermag High Intensity Electromagnetic Filter is designed for the continuous removal of ferrous particles from many liquid based applications, particularly ceramic, slips and glazes and is designed to handle from 45 litres per minute to 900 litres per minute.

Filters are fitted with an auto backflush system on a timed cycle to enhance performance and to prevent clogging. This feature proves to be particularly successful where superior quality ceramics are required, outperforming comoetitor units.

The Filters eneble companies to overcome the perennial problem faced by the ceramic industry of eliminating iron contamination in the glaze and slip processes, dramatically reducing structural and cosmetic defects in the manufactured product, resulting in costly rejects.

REQUIREMENT

Traditionally, heavy patterns disguised cosmetic defects but modern taste for delicate, fine patterns and plain backgrounds mean the ceramic industry is faced with finding effective solutions to contamination problems, or else reject a higher proportion of products.

Iron contamination can occur naturally from iron bearing minerals, such as hematite, chalcopyrite, ilmente and biotite micas which appear in many of the raw materials used for ceramics. Most of these minerals are removed during preparation, but some may pass to the fine grinding stage.

Introduced contamination is often the result of machinery wear when in contact with abrasive materials and this, together with oxidation, can lead to particles entering the product stream. During the process of abrasion the particles harden and this can induce paramagnetism. The high intensity magnetic separator will remove a high percentage of paramagnetic particles.

OPERATION

The Mastermag filter consists of a highly efficient computer designed coil, into which a canister containing a stainless steel matrix is inserted. The slurry is pumped through the matrix, which allows greater control of particle residence time. Magnetic contaminates are washed down through the matrix once the separator is de-energised.

The matrix amplifies the background magnetic field to produce points of very high magnetic intensity and gradient. A typical amplified field produced by the matrix is many times that of the background field.

Mastermag High Intensity Electromagnetic Filters are supplied with a single inlet and outlet to and from the matrix. Product is fed to the separator at the bottom via a butterfly valve and passes up through the energised matrix. Ferrous particles are captured by the matrix and the cleaned product passes out at the top of the separator via another butterfly valve and on to the next processing stage. During the filter cycle, valves 1 & 2 remain closed. See fig. (1)

To produce clean product

a) Energise magnet coil
b) Open valves 1 + 2

To discharge collected magnetic

a) Close valves 1 + 2
b) Open valves 3 + 4
c) Switch off magnet coil
d) Wash matrix through

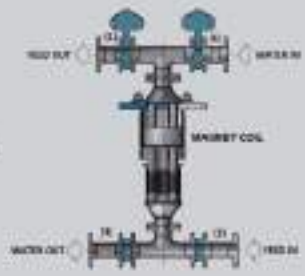


Fig 1.

The cleaning cycle time is adjustable on the control panel. If uninterrupted product flow is required, two filters installed in parallel and controlled automatically will give continuous flow.

Other products used within the ceramics industry include: pipeline magnetic filters, magnetic tubes and grates; plate magnets and suspension magnets.

We encourage potential clients to send us a representative sample of contaminated product for testing and evaluation in our fully equipped mineral processing laboratory.

MASTERMAG

Master Magnets

Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA
E-mail: info@mastermagnets.co.uk Tel: +44 (0)1527 65858 Fax: +44 (0)1527 65868
www.mastermagnets.com

MASTERMAG

FOOD PROCESSING & SAFETY
INDUSTRY GUIDE

Master Magnets manufacture a wide range of food-grade magnetic separation and metal detection equipment for the efficient removal of metallic contaminants.

Many types of metal contamination can enter a food processing line and magnetic separators are often utilised to protect the product stream from nuts, bolts and other machinery parts that inadvertently fall from upstream processing equipment.

Designed to suit conventional process lines, the Mastermag food-grade magnets can be fitted to conveyors, chutes, ducts and pipelines in pressurised or gravity feeds and to suit wet or dry products. All magnets are available in standardised ranges to suit common specifications or can be designed bespoke to suit a client's specific plant system.

All permanent magnetic systems can be constructed with either Strontium Ferrite or Neodymium Iron Boron magnetic material depending on the application and the size of the contamination to be removed. Permanent magnets have the benefit of requiring no power source, providing continual protection against ferrous contamination.

For the detection and removal of various fine metal contaminants, including non-ferrous and stainless steels, High-Sensitivity Metal Detectors can be incorporated into the process. Detectors can be supplied for the inspection of ingredients in a pipeline or for final packaged products on a conveyor.

www.mastermagnets.com

FOOD PROCESSING & SAFETY

LIQUID PIPELINE MAGNETS

Used for the removal of ferrous particles from liquid or viscous product. Contaminants are attracted and held by high strength permanent magnetic tubes inserted into the flow line.

GRID MAGNETS

Constructed with either Ferrite or Rare Earth magnetic tubes, permanent magnetic grids are most commonly installed within hoppers or chutes and are available with a retractable drawer-type magnet system for easy cleaning

PLATE MAGNETS

Used for the removal of ferrous contaminants from shallow burden depths of material, magnetic plates can be installed either above the product stream or fitted within chutes to allow free-flowing material to run over the magnetic surface.

For use in high volume separation and where the product is to be kept free from external contamination or where dust may be given off during processing. Totally enclosed drum magnets allow material to flow directly over the surface of the rotating drum. Ferrous contaminants adhere to the drum surface until they are discharged behind the centre line, whilst non-metallic product free-falls at its normal trajectory.

TOTALLY ENCLOSED DRUM SEPARATORS

Designed for gravity feed and pressurised pipeline systems, the bullet magnet allows material to flow directly over an internal conical-shaped magnet system. The magnetic system is mounted to the quick-release doors for easy cleaning.

BULLET MAGNETS

For the detection of much finer metallic particles, including non-ferrous metals and stainless steel, high-sensitivity food grade metal detectors can be installed into conveyor lines. Detectors can be supplied for the inspection of ingredients in a pipeline or to check the final packaged product on conveyors.

HIGH SENSITIVITY METAL DETECTORS

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for their high performance and reliable operations.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

MASTERMAG

INDUCED ROLL SEPARATORS

The high specification separat

Applicability

MasterMag Induced Roll Magnetic Separators are applied in extraction and concentration or purification of a wide range of minerals, chemicals and metallics.
Separation is achieved by exploiting the magnetic properties of the material, however feeble.
Provided the material is dry, free flowing, and of grain size that allows it to flow through a narrow slot, MasterMag Induced Roll separators should be applicable.
As a guide the following list indicates varying degrees of magnetic susceptibility of typical minerals which may be separated.

Approximate magnetic intensities required for separation:

	Tesla		Tesla
Alabandite	1.5 - 1.9	Monazite	1.4 - 2.0
Ankerite	1.3 - 1.6	Muscovite	1.5 - 2.4
Biotite	1.0 - 1.8	Olivine	1.1 - 1.5
Braunite	1.4 - 1.8	Pyrolusite	1.5 - 1.9
Chromite	1.0 - 1.6	Renierite	1.4 - 1.8
Columbite	1.2 - 1.6	Rhodochrosite	1.5 - 2.0
Garnet	1.2 - 1.9	Rhodonite	1.5 - 2.0
Goethite	1.5 - 1.8	Samarskite	1.6 - 2.0
Heamatite	1.3 - 1.8	Siderite	1.0 - 1.8
Hornblende	1.6 - 2.0	Staurolite	1.2 - 1.9
Ilmenite	0.8 - 1.6	Serpentine	0.5 - 1.8
Itabirite	0.8 - 1.4	Struverite	1.0 - 1.6
Kimberlite	0.6 - 1.6	Tantalite	1.3 - 1.7
Leucoxene	1.2 - 1.8	Tourmaline	1.6 - 2.0
Limonite	1.6 - 2.0	Wolframite	1.2 - 1.6
Martite	0.2 - 0.6	Xenotime	1.1 - 1.6

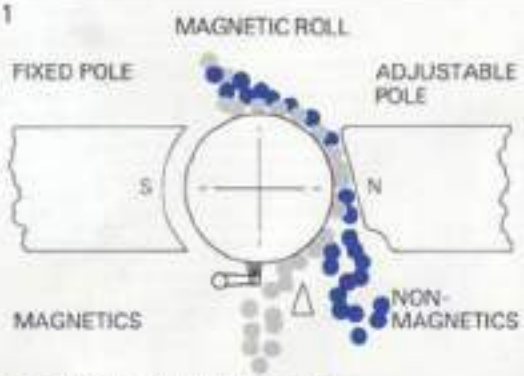
Used for removal of magnetic impurities from:

- Apatite
- Baddeleyite
- Barite
- Bauxite
- Calcite
- Cassiterite
- Corundum
- Feldspar
- Flint Clay
- Glass Sands
- Kyanite
- Limestone
- Manganese
- Mica
- Mullite
- Nepheline Syenite
- Petalite
- Quartz
- Rutile
- Scheelite
- Silicon Carbide
- Spodumene
- Wollastonite
- Zircon

Other Separations including:

- Grinding and Swarf
- Foundry Sands
- Weak magnetic contaminants in metal powders

Fig. 1



Typical Magnetic/Non-magnetic separation

Principal of Operation

The material being treated is fed from a hopper or vibratory feeder at a controlled rate onto a high intensity magnetic roll. Feebly magnetic material attaches itself to the roll face or is deflected towards the roll. Non magnetic material is thrown off the face at a normal trajectory. Magnetic material is discharged off the roll face at a point of lower magnetic intensity aided by a brush. A splitter plate is interposed between the two product streams (See fig. 1.)

Removal of Highly Magnetic Particles. (For example Abraided Iron and Magnetite.)

Due to the high intensities involved in the operation of the MasterMag series of induced rolls, it is essential that highly magnetic material be removed prior to treatment by the main rolls.
To achieve this we can supply a magnetic scalper roll that forms part of the iron circuit of the main rolls (See fig. 2.)
This system is sufficient when iron levels are below 0.5%. However when this figure is exceeded, the scalper becomes less efficient and should be replaced by a MasterMag permanent alternating Pole Drum Separator. In general we recommend the use of a drum separator (See fig. 3.)

Fig. 2

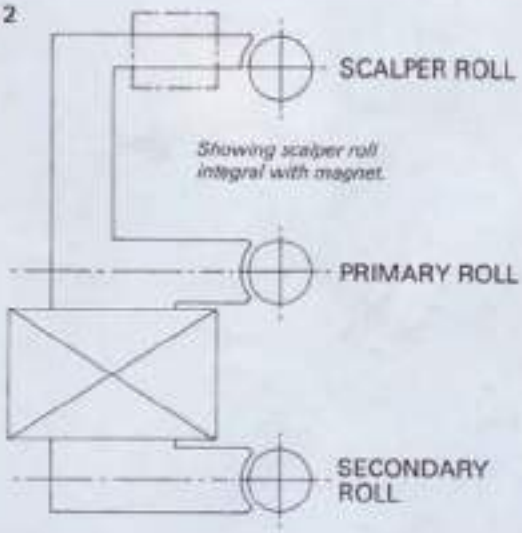
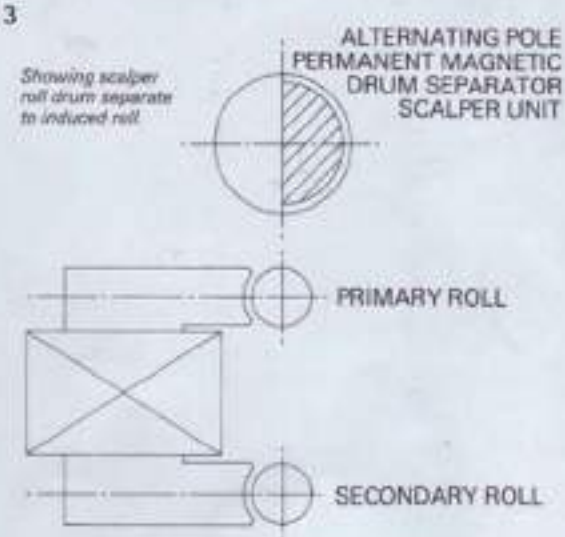


Fig. 3



or with the purchaser in mind

Capacity

Capacity of the separator is dependent on the grain size, the quantity of "fines" present (-50 microns), the degree of purification or concentration required, and the magnetic characteristics of the mineral or product to be removed or concentrated.
Throughputs can vary per metre width of roll from 8 t.p.h for purification of quartz, to 2 t.p.h. for purification of cassiterite.
Some typical capacities are listed below:

Beach Sand Application	Per metre roll width
Extraction of Ilmenite	4 t.p.h.
Purification of Rutile and Zircon	3.5 t.p.h.
High Value Minerals Application	
Cassiterite separation from Siderite	2 t.p.h.
Scheelite from other magnetic materials	1.75 t.p.h.
Upgrading Application	
Hematite from Silicates	5. t.p.h.
Limonite from Silicates	2.5 t.p.h.
Chromite and other Silicates from Serpentine	3. t.p.h.
Industrial Application	
Purification of Abrasive	3.5 t.p.h.
Purification of Plastics	4 t.p.h.

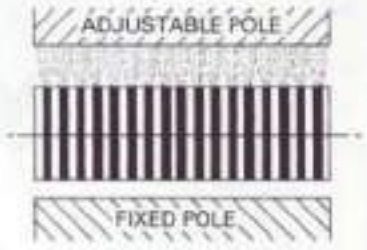
Design Features

MasterMag induced rolls have been perfected by engineers having a lifetime of experience in this field. We have, over a period of years, noted the advantages, and disadvantages of machines of other manufacture and our designs reflect this knowledge.

Feed Hopper
Non-magnetic stainless steel construction, finely controlled adjustable feed gate with positive shut off designed for uniform feed with minimum bounce. Large surge hopper can be supplied if required.

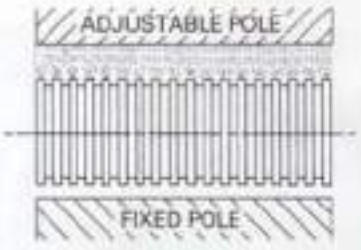
Roll Construction
Laminated roll construction with non-magnetic shaft – smooth or serrated roll face (see figs. 4 & 5). High roll speeds (70-550 rpm) with minimum power requirements (see fig. 6.). High magnetic intensities (see fig. 7.)

Fig. 4



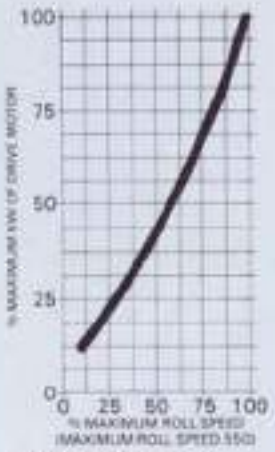
Laminated smooth roll face indicating flux path.

Fig. 5



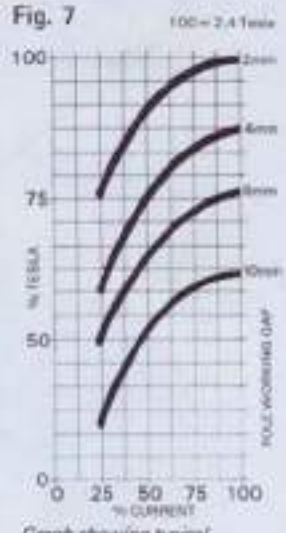
Laminated serrated roll face indicating flux path.

Fig. 6



Graph showing typical relationship of drive motor power to roll speed.

Fig. 7



Graph showing typical variation of Tesla on roll face due to changing coil current or pole to coil working gap.

Drive Motor
Can be constant or variable speed, our engineers can advise, or our laboratory can establish correct speed based on trials.

Adjustable Pole Nose
Maximised dwell time poles of different profiles, again consult our technical engineers for correct selection.

Adjustable Splitter Plates
In stainless steel normally consist of a single splitter, however in certain cases splitter plates can be fitted with provision for middlings product for different modes of treatment (see fig. 9.)

Treatment Options
Purification of non magnetics (see fig. 8.), magnetic product recovery (see fig. 9.), purification of magnetics (see fig. 10).

Chutes
All chutes are stainless steel and are designed to withstand abrasion and to eliminate blockages.

Energising Coil
The magnet circuit provides for minimum flux leakage, continuously rated long life coils are enclosed and employ the most modern techniques for heat dissipation ensuring high amp/turns, low heat generation.

The magnetic intensity may be varied electrically from the control panel or mechanically by variation of the adjustable pole/roll working gap (see fig. 7.)

Control Panel
The totally enclosed control panel is to IP-65 specification incorporating solid state circuitry. A constant current device is available.

Master Magnets Induced Roll Separators are designed with the plant operators in mind for ease of operation and maintenance. Great attention is paid to detail and quality of workmanship.

Induced Roll Separator - Model 4.3000

Fig. 8

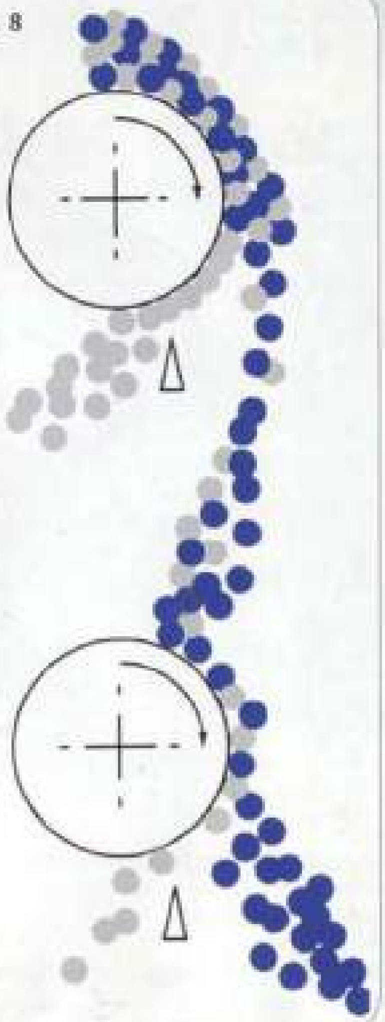
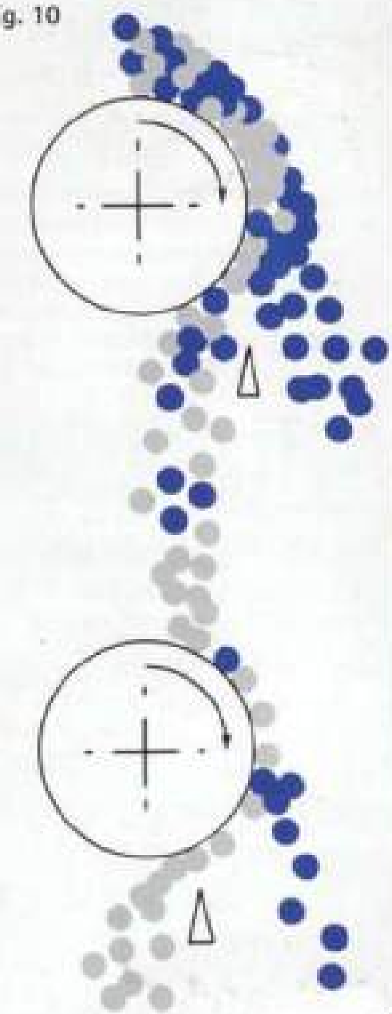


Fig. 9

Fig. 10



The Complete Range of Mineral Separation Equipment

Master Magnets engineers have a fund of knowledge and experience across the whole range of industrial magnetic applications, particularly relating to mineral separation. Below are three products from our range used in wet and dry mineral separation.

Masteroll - Model shown Dual Roll with auto belt-tracking

Electro Magnetic Filter with backflush system

Wet Drum Separator

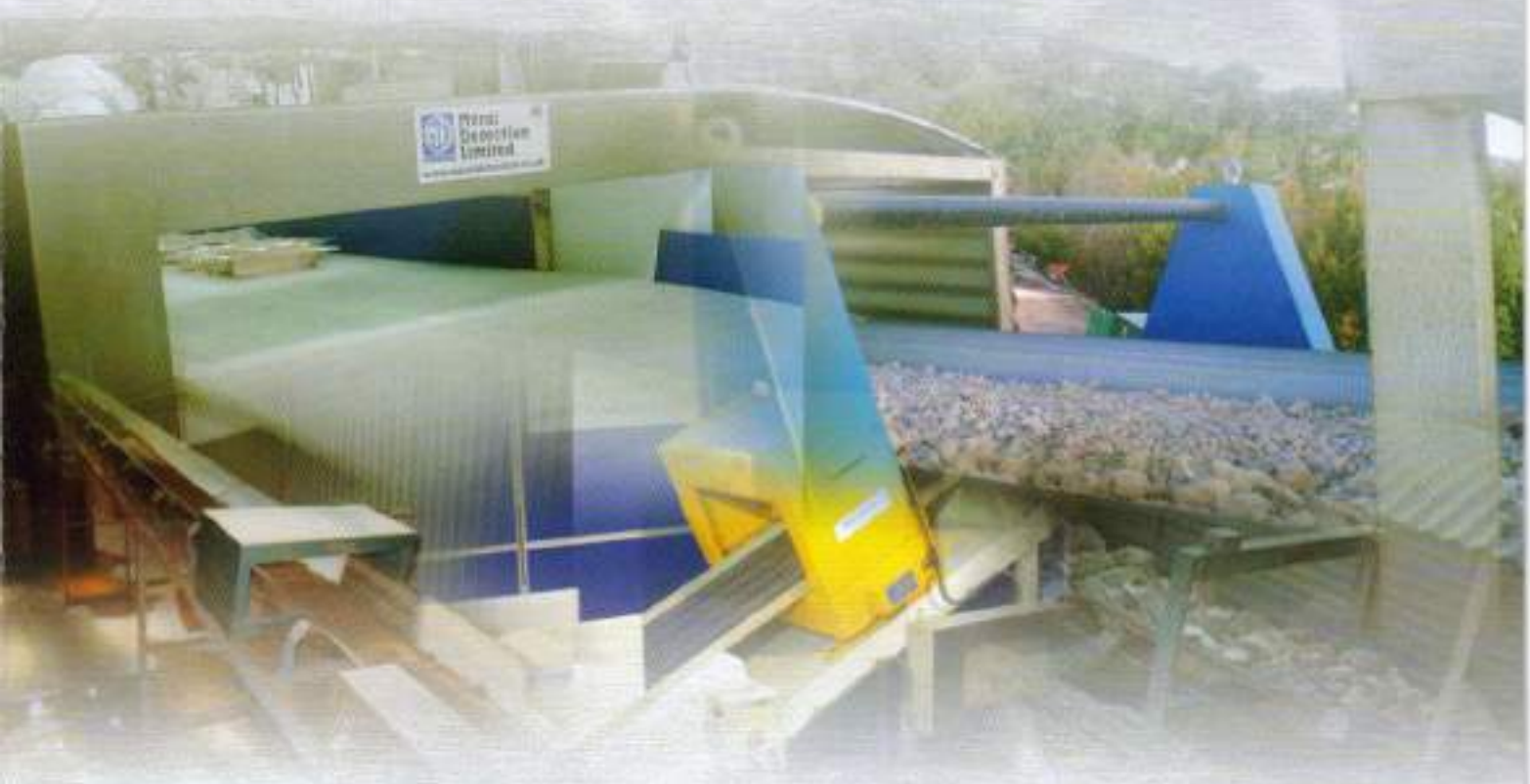
Master Magnets have over twenty five years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals separation. The MasterMag range of systems are known for high performance and reliable operations and also include suspension magnets, overband magnets, drums and pulleys, eddy current separators and lifting magnets.

MASTERMAG

MASTER MAGNETS LTD
Incorporating Integrated Recycling Systems Ltd
Burnt Meadow Road, North Moons Moat,
Redditch, Worcestershire B98 9PA
Tel: +44 (0)1527 65858 Fax: +44 (0)1527 65868
Email: info@mastermagnets.co.uk
Website: www.mastermagnets.co.uk

Metal Detection

METAL DETECTION
PRODUCT RANGE



MASTERMAG

A MASTER MAGNETS COMPANY

TUNNEL TYPE TN77 **METAL DETECTOR**

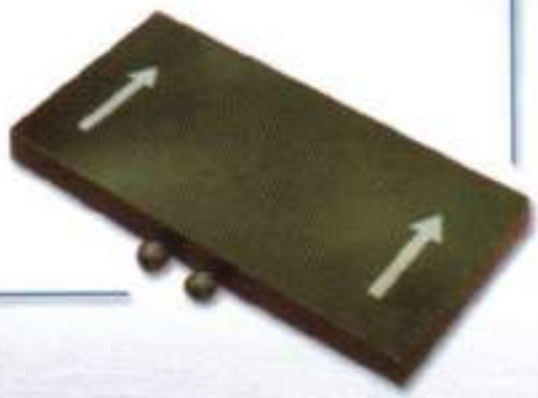
SUMMARY

- Reliable protection against damage and loss of product.
- Detection of tramp iron and manganese steel including most non magnetic digger teeth.
- Easy installation into existing conveyors.
- Simplicity of operation, fully adjustable sensitivity/detection level with indication if 1 or 2 pieces of tramp iron are detected.
- Overlooks non magnetic - copper alloy belt fasteners.

UNDERBELT MDB5/EPS-EPB **METAL DETECTOR**

SUMMARY

- Underbelt metal detector for a wide variety of applications.
- Detection of ferrous and non-ferrous metals.
- Models to suit various belt widths.
- Easy to install - simplicity of operation.
- Compact design - ideally suited for shallow burden applications.
- Most economical solution to tramp metal problems



METAL DETECTION **PRODUCT RANGE**

TUNNEL TYPE MDB5/QTA **METAL DETECTOR**

SUMMARY

- Reliable protection for all crushing and processing plants.
- Detection of all tramp metals-ferrous, manganese steels and non ferrous.
- Heavy duty construction for quarrying and mining applications
- no belt cutting required for installation.
- Ease of operation, adjustable sensitivity/detection level - facility for material effect.
- Available with a choice of electronic control units and options

TUNNEL TYPE MDB5/QDC **METAL DETECTOR**

SUMMARY

- Reliable protection for all processing equipment and machinery.
- Detection of ferrous and non ferrous metals.
- Easy installation into existing belt conveyors - without the need for cutting the belt.
- Simplicity of operation, adjustable sensitivity/detection level and product compensation facility.
- Available with a choice of electronic control units and options.

FREE FALL TRANSITECT **METAL DETECTOR**

SUMMARY

- Metal detector only or metal detector with separator/rejector.
- Detection of ferrous and non-ferrous metals.
- High sensitivity and includes fault indication facility.
- Easy to install - simplicity of operation and minimal headroom requirements.
- Available to suit 25, 50, 100, 150 and 200mm nominal diameter pipelines.
- Optional features and facilities available.

THE DISCOVERY **METAL DETECTOR**

SUMMARY

- Detection of ferrous and non-ferrous metals as well as stainless steel.
- High sensitivity and automatic product effect adjustment.
- Reliable protection against the smallest of metallic contaminants.
- Inspection of products on conveyors and pipelines.
- Optional features and facilities available.

Metal Detection Ltd has been established in the electronic metal detector business for over 40 years, manufacturing and supplying industrial metal detectors and metal detection systems world-wide. Please visit our website at **www.metaldetection.co.uk** to view the entire range of Metal Detection equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@metaldetection.co.uk Web: www.metaldetection.co.uk www.mastermagnets.com

MASTERMAG

MASTERMAG

MASTER MAGNETS
INDUSTRY GUIDE

MAGNETIC SEPARATION EQUIPMENT
FOR MINING, QUARRYING AND MINERALS CONCENTRATION INDUSTRY

The range of magnetic separation equipment commonly used in the mining and minerals concentration industry is split into two categories: Overband, Suspension and Pulley Magnets are used primarily for the extraction of tramp iron from the mined product. Overband Magnets are commonly installed on mobile

OVERBAND MAGNETS

The Overband Magnet is available as a permanent or electro-magnetic self-cleaning unit for the installation on mobile crushers or over conveyor lines, feeders and gravity chutes.

Overbands allow the continuous separation of general tramp iron from mined products. They are manufactured to be of solid and robust construction in order to withstand the most arduous conditions.

Armour-clad belting is available to increase the service life of the belt when dealing with abrasive materials. Heavy-duty electro magnetic Overbands are also available for more demanding applications.

SUSPENSION MAGNETS

Suspension Magnets are used for the extraction of occasional tramp iron from deep product burdens. These magnetic separators are available with either a permanent magnet system or as an air-cooled or oil-cooled electro magnet.

Suspension Magnets are typically installed over conveyors but can also be used to extract ferrous materials from above vibratory feeders or gravity chutes.

The magnets are available with a complete range of ancillary equipment to aid cleaning operation and to suit application criteria.

PULLEY MAGNETS

The Pulley Magnet is installed at the head of a belt conveyor for the continuous extraction of iron contamination.

The 360° magnet system retains extracted iron, discharging it behind the centre line of the pulley, whilst the clean product follows its natural trajectory.

All units are available with either ferrite or rare earth magnet systems dependent on specific extraction requirements. Electro magnet systems are also available and are typically used for heavy-duty applications.

METAL DETECTORS

Metal Detection Ltd (part of the Master Magnets group of companies) has over 40 years experience in providing detection solutions to the mining and quarrying industries.

Used for the protection of valuable processing machinery and providing cleaner end products, Metal Detection can supply many various types of detector units to suit specific applications.

HIGH SPEED DRUMS

High Speed Drums are used for the separation of highly magnetic ores such as iron ores, nickel ores, roasted ilmenite and similar in a dry state.

Ore is fed onto the face of the drum as the shell rotates, the material undergoes a tumbling action releasing non magnetics or partially liberated material.

The drum is mounted in a robust mild steel enclosure, supplied as standard with inspection covers, feed hopper, product drive plates and aspirators for dust extraction.

DRUM MAGNETS

The Drum Magnet is often used in applications where the extraction of very small ferrous materials is required. Typically supplied with a permanent magnet system, the drums can be used for a wide range of applications within the mining and quarrying industries.

The drums can be fitted into totally enclosed housings where product must be kept from external contamination and for more demanding applications, the Drum Magnet is also available with a rare earth or electro magnet system.

Large diameter electro magnetic drums can be used for steel works slag recovery and similar heavy-duty applications.

crushers for this purpose. Magnetic separators are also used for the concentration of mineral products. The separators shown below are capable of achieving the high magnetic intensities necessary for the efficient separation and concentration of paramagnetic minerals.

WET DRUM SEPARATORS

Wet Drum Separators are used to remove fine magnetic materials from low-viscosity liquids.

Common applications include the recovery of magnetite/ferrosilicon in dense media plants and for the concentration of iron ores.

Wet Drums are available as single or multistage units with concurrent, counter flow and counter current tank designs depending on a customers' specific application. Demagnetising coils can also be supplied so that separated materials can be demagnetised once recovered.

MASTEROLL RARE EARTH ROLLS

Powerful Neodymium Iron Boron (Rare Earth) magnetic rolls suitable for the continual dry separation of minerals.

Masterolls are available in single, double or triple roll configurations with auto belt tracking, enclosed guarding and variable speed belts and rolls.

Applications include the separation of paramagnetic content from feldspar, zirconium oxide, quartz and similar.

DISC SEPARATORS

For the selective separation of a mixture of minerals of varying magnetic susceptibility in one pass with minimum entrapment.

The Disc Separator consists of one or more rotating discs placed above powerful electro magnet circuits.

Up to seven different products can be separated in one pass on a three disc separator.

HIGH INTENSITY FILTERS

Filters incorporate a powerful electro magnetic coil or permanent magnetic element which surrounds a matrix.

Filters are used for the continuous separation of fine paramagnetic contamination from slurries.

Filters can be designed to produce very high gauss intensities within the matrix for extremely high purity separations. Electro filters are fitted with self cleaning auto backflush systems.

INDUCED ROLL SEPARATORS

High capacity separators for the concentration of finely sized paramagnetic ores and for the purification of non metallic minerals.

Induced Roll Separators utilise the magnetic induction of rolls via powerful electro magnets to treat a variety of materials. Single and multiroll arrangements up to 1000mm wide are available.

WHIM SEPARATORS

Wet High Intensity Mineral Separators are used for the continuous extraction and concentration of fine paramagnetic materials presented in a wet state.

WHIM units can be designed as single, double, 4-station or 6-station units. The 8-station separator has a capacity of up to 160 tonnes per hour.

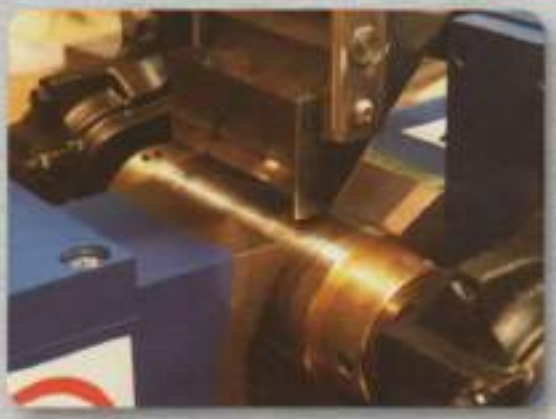
LABORATORY SAMPLE TESTING SERVICE

To arrive at the best separation criteria, Master Magnets uses a fully equipped laboratory for material testing to ensure optimum equipment selection.

Customers are invited to submit samples for testing and evaluating to enable separation guarantees to be given.

Initial trials are normally carried out free of charge and customers are encouraged, if practicable, to participate in the testing and processing procedure.

LABORATORY SCALE EQUIPMENT



The MasterMag range of magnetic separation equipment can be supplied to laboratory scale.

Separators previously supplied to laboratories include induced rolls, alternating pole drums, isodynamic separators, wet high intensity separators and wet drums.

Other laboratory equipment for the minerals dresser includes ore testers and wet test chutes with feeders as required.

Laboratory scale Masteroll separator with vibratory feeder.

A HISTORY OF MINING AND MINERALS SEPARATIONS

Master Magnets has enjoyed global success with its range of pioneering magnetic separators for mining and minerals concentration industry.

Minerals separation equipment has been sold worldwide for uses ranging from the processing of iron ore to extremely high quality ceramics production.

Master Magnets can provide excellent references from customers for all our separators and have built a reputation for quality and high performance.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

MASTERMAG

MASTER MAGNETS
OVERBAND SEPARATOR

Master Magnets range of permanent and electro overband magnets is one of the widest available. They are used for the continual and safe removal of tramp metal from conveyor lines, vibratory feeders and chutes.

In mining, quarrying, recycling and allied industries overbands remove metal contamination from a product stream, upgrading the quality of the final product and protecting processing equipment.

Overband Magnets can be installed in-line or across the feed line and are used where a high level of contamination is expected and a self cleaning device is required.

The principle of operation is relatively simple: The overband magnet is suspended above the feed line. As tramp metal passes under the magnet, it is lifted out of the product feed, and then swept out of the magnetic field to a discharge point by the cleated overband magnets. Depending on the application, permanent or electro magnets can be utilised.

www.mastermagnets.com

PERMANENT OVERBAND SEPARATORS

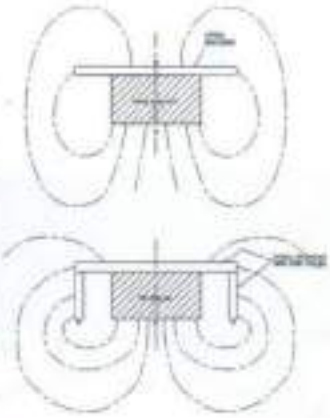
Type K

The Master Mag Type K overband separator is an economic and highly versatile alternative to more expensive electro magnet separators. Master Magnets pioneered the permanent overband separator specifically for the removal of steel rebar from crushed concrete back in the 1980's.

With a permanent magnet block, the separator is considerably lighter and more compact than electro magnets and requires no power source to the magnet, saving on cost and cabling. The permanent magnetic block is non-deteriorating and barring mistreatment, will have an unlimited operating life. It is designed to be virtually maintenance free and is available with either electric or hydraulic drives.

The Type K self cleaning magnet is mainly used in the quarrying and recycling applications where it can be positioned either inline over the head pulley or across a conveyor belt. It is designed to be virtually maintenance free and is available in either electric or hydraulic drive. It is the most popular product in the Master Magnets range for the removal of ferrous contamination.

Master Magnets supply overband magnets to operate over conveyor belts up to 2 meters wide. They can be custom designed to suit the application and additional support structures can also be custom designed and manufactured.



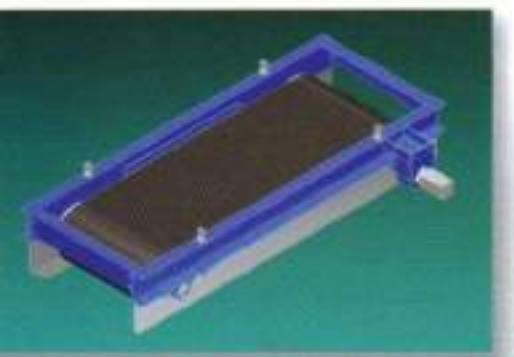
If the operating gap is 300mm or higher, the Type K incorporates a Tri-polar design as standard. The tri-polar design utilizes massive steel side members to effectively give three poles across the bottom face of the magnet, intensifying the field in the centre of the magnet block. Master Magnets also recommend a tri Polar design for operating heights below 300mm, where there is need to separate small ferrous contaminates such as nails and screws.

The Tri Polar Advantages;

- Prevents magnetic leakage
- Produces a cleaner frame
- Achieves a better extraction
- Reduces belt damage

Type R

The Type R Overband Separator is the latest type of overband in the Master Magnets product range, designed using the latest CAD software, knowledge and expertise. It was developed for recycling operations to separate larger pieces of ferrous contamination from oversize material.



The Type R uses a single pole magnet, benefiting from a reduced magnet block size but retains the Master Magnets high quality and separation efficiency.

This development will provide a client with:

- Economical means of separating ferrous from waste materials
- A separator that is lighter in weight
- A more compact separator

ELECTRO OVERBAND SEPARATORS

Electro Overbands

Electro magnetic overbands are normally used at greater operating gaps where the magnetic strength required can not be achieved by permanent magnets. They can also be used at lower gaps where there is a requirement to de-energise the magnet or a specific extraction is called for. Magnet selection takes into account full application parameters, including extractions. This ensures that the most economical design is proposed to meet the required performance.

The magnet can be air or oil cooled, in both cases computer design techniques ensure that the coil remains at its optimum working temperature.

All of our oil cooled magnets benefit from a special coil design that ensures that the cooling medium reaches all areas of the winding which in turn maximises the life and efficiency of the coil.

Specific designs are available to cope with continuous operation in high ambient temperatures. Coils are wound in nomex covered aluminium around high permeability steel cores and are encased in substantial steel fabrications. The casing design takes into account structural and magnetic design factors to ensure the field is concentrated in the working area of the magnet.

The overband framework is of heavy duty construction and uses high quality bearings and conveyor belting to give a long and reliable operating life. Purpose designed suspension mountings make site installation simple and straightforward.

HEAVY DUTY OVERBAND SEPARATORS

SCB

The SCB series has been developed by Master Magnets as an up rated permanent overband separator. The SCB incorporates many features that are similar to the Type K design, such as tri-polar magnetic circuitry.

The design has specifically taken into account ease of belt change. The Magnet block is fixed within the structure of the framework and the pulleys are mounted on the extremities of the frame. Belt removal is achieved by simply removing guards and slackening its tension screws which allows the belt to slide off. Fitting a new belt is a simple reversal of this process: a new endless belt is placed over the framework of the magnet and tightened. This reduces downtime significantly during maintenance.

Where the SCB is required to handle hot or abrasive materials for additional protection it features an optional armour clad belt. Constructed from individually replaceable stainless steel plates, the armoured covering increases the operational life of the belt and reduces damage to the magnet system base. Drive motor and other component parts have also been up rated and re-designed for an increased service life and reliability.

Availability

Master Magnets hold in stock Overband Separators ready for a next day delivery. Only common sizes and models will be held in stock, so please contact the Master Magnets Sales team to check stock availability. More uncommon sizes and bespoke designs can still be produced on short delivery periods.

Master Magnets is now listing current stock items online. Updated weekly, the site shows items available and ready for despatch – with many more stock items coming on stream throughout 2008. Please check website for latest availability.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com

MASTERMAG

MASTERMAG

MASTER MAGNETS
INDUSTRY GUIDE

MAGNETIC SEPARATION EQUIPMENT

FOR THE RECYCLING AND WASTE MANAGEMENT INDUSTRY

The process of recycling and reclamation invariably involves end-of-life products that may be shredded, crushed or fragmentised and require separation. Master Magnets supply the widest range of industrial magnetic equipment for the separation of ferrous and non-ferrous metals,

OVERBAND MAGNETS

Overbands are designed for the continuous separation of general tramp iron from various recyclable materials. The self-cleaning Overband Magnets are available with either Permanent or Electro magnet systems depending on the specific application requirements. The Electromagnet range is often applied for more demanding applications, requiring the removal of difficult particles from larger operating gaps.

Typical applications include separation and recovery of ferrous metals from MSW, Shredded Wood, C&D waste and shredded PVC.

With models to suit all conveyor widths, the Master Magnets range of Overbands are manufactured to be of solid and robust construction in order to withstand the most arduous conditions.

SUSPENSION MAGNETS

Suspension Magnets are used for the extraction of occasional tramp iron from deep product burdens. These magnetic separators are available with either a permanent magnet system or as an air-cooled or oil-cooled electro magnet, depending on a client's application.

Suspension Magnets are typically installed over conveyors but can also be used to extract ferrous materials from above vibratory feeders or gravity chutes.

PULLEY MAGNETS

The Pulley Magnet is installed as a direct replacement for the existing head drum of a belt conveyor for the continuous extraction of iron contamination. The 360° magnet system retains extracted iron, discharging it behind the centre line of the pulley, whilst the clean product follows its natural trajectory.

All units are available with either ferrite or rare earth magnet systems, depending on specific extraction requirements. Electro magnet systems are also available and are typically used for heavy-duty applications.

DRUM MAGNETS

Magnetic Drum Separators are designed for the continuous extraction of iron from materials being fed uniformly to the face of the drum. Often used in applications where the extraction of very small ferrous particles is required, Drum Magnets can be used on a wide range of processes within the recycling industry. For dusty materials or where product must be kept free from external contamination, the Magnetic Drums can also be fitted into totally enclosed housings.

When applications involve larger volumes of material such as scrap metal recycling, Magnetic Drums are available with Electro magnet systems and in diameter sizes of up to 72 inches (1830mm).

from material such as aggregate, demolished construction material, plastics, rubber and shredded wood as well as end of life goods including cars, computers and any application where ferrous or non-ferrous metal is to be separated and reclaimed.

CONCENTRIC EDDY CURRENT SEPARATORS

Used for the separation and recovery of non-ferrous metals from all types of recyclable material, Master Magnets manufactures a range of Non-ferrous separators, each designed to suit varying application requirements.

Typical applications for the High-Intensity Concentric ECS units include separation of non-ferrous metals from construction materials, glass cullet, shredded wood and end of life vehicles.

ECCENTRIC EDDY CURRENT SEPARATORS

For applications that require separation of finer non-ferrous particles, Eccentric ECS units can be supplied. The Eccentric rotor differs 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, giving maximum repulsion where the conveyed materials discharge from the rotor.

R TYPE ECS

The 'R Type' fits into the Master Magnets ECS range between the Can Sorter and the High Intensity units, incorporating features of both machines. Fitted with a 12 pole rotor, the 'R Type' is designed for sorting non-ferrous metals from dry recyclables.

CAN SORTER ECS

The Can Sorter is specifically designed for the separation of non-ferrous beverage cans from dry recyclable materials. The Can Sorter is a simplistic and cost effective solution providing optimum can recovery.

METAL DETECTORS

Metal Detection Ltd (part of the Master Magnets group of companies) has over 40 years experience in providing a range of equipment for the inspection of various recyclable materials.

Typical products to be inspected include animal bedding & wood chip, food packaging, glass cullet and aggregate.

SITE EVALUATION SERVICE

As part of our initial assessments, Master Magnets offer a site evaluation service so that we can recommend the most efficient form of magnetic separation for a particular application.

This also enables one of our company representatives to hold a personal meeting with the client, explaining face to face how best to utilise a magnetic separator in order to achieve optimum separation.

SAMPLE TESTING SERVICE

To arrive at the best separation criteria, Master Magnets uses a fully equipped laboratory for material testing to ensure optimum equipment selection.

Customers are invited to submit samples for testing and evaluation, to enable separation guarantees to be given.

Initial trials are normally carried out free of charge and customers are encouraged, if practicable, to participate in the testing and processing procedure.

REPAIR AND REFURBISHMENT SERVICE

Master Magnets offer a full repair and refurbishment service for all types of magnetic equipment. The range of services offered includes:

Appraisal: Site Visit and preliminary report.

Inspect and Report: Equipment stripped down and inspected in our works facility and a detailed quotation for refurbishment or repair provided.

Repair Service: Mechanical, electrical and fabrication repairs carried out in our comprehensive workshop.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for their high performance and reliable operations.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Metal Detection Ltd.
Burrit Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

APPLICATIONS

- **ASR Stainless Steel Separation / Zorb Purification**
  [illegible]
- **Appliance Recycling Stainless Separation**
  [illegible]
- **ICW Wire Separation / Wire Chopping Purification**
  [illegible]

SPECIFICATIONS

HISC® High Intensity Separation Conveyor™

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

SSSC® Stainless Steel Separation Conveyor™

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

A Bunting. Magnetics Company

STAINLESS STEEL SEPARATORS

www.mastermagnets.com

Stainless Steel Solutions

High Intensity Separation Conveyor™ | Stainless Steel Separation Conveyor™

2 Machines to Hold, Attract and Extract Stainless Steel Metals

HISC™ High Intensity Separation Conveyor™

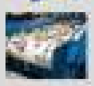
Magnetic Separation of Small and Mid-Sized Stainless Steel from 10mm to 80mm

Pulley Diameter	[illegible]
Pulley Construction	[illegible]
Belt	[illegible]
Belt Speeds	[illegible]
Sideguards	[illegible]
Frames	[illegible]
Motor	[illegible]
Capacity	[illegible]

SSSC™ Stainless Steel Separation Conveyor™

Magnetic Separation of Small to Large Sized Stainless Steel 10mm to 50mm

Pulley Diameter	[illegible]
Pulley Construction	[illegible]
Belt	[illegible]
Belt Speeds	[illegible]
Sideguards	[illegible]
Frames	[illegible]
Motor	[illegible]
Capacity	[illegible]



MASTERMAG

ELECTRO AND PERMANENT SUSPENSION MAGNETS

The **Master Magnets** range of **permanent and electro suspension magnets** are specifically designed for the removal of occasional tramp iron from conveyed materials. Commonly used in the mining, quarrying and recycling industries, suspension magnets are an invaluable solution to the protection of processing machinery and for upgrading the quality of the final product.

www.mastermagnets.com

PERMANENT SUSPENSION MAGNETS

The Master Magnets range of permanent magnets provide customers with an indefinite, maintenance-free service life, if not mistreated and also benefit from not requiring a power source. Permanent suspension magnets are manufactured using individual magnet blocks, which are pre-assembled before they are energised to give maximum magnetic performance.

For applications that require a magnet to be installed at an operating gap of 300mm or higher, our Tri-polar magnet system is incorporated into the design. The Tri-polar design utilises large steel side members as shown in the illustration, to effectively give three poles across the bottom face of the magnet. With the Tri-polar range of suspension magnets, an 8mm thick manganese steel impact plate is fitted to the system to reduce product damage to the magnet from the larger sized tramp metals that the units are able to extract.

The Tri-Polar Advantages;

- Prevents magnetic leakage
- Results in a cleaner frame
- Achieves a better extraction

An easy clean system can also be fitted to the permanent magnet range to ensure the safe removal of any collected tramp metal from the face of the magnet, avoiding injury to operating personnel.

ELECTRO SUSPENSION MAGNETS

Our electro range of suspension magnets has been extended over the past few years to cater for the ever increasing conveyor speeds, size of conveyors and deeper belt troughing.

As with the permanent suspension magnets, the electro range also requires manual cleaning, however the cleaning process of an electromagnet is much simpler as any collected materials can simply be removed by switching off the power supply to the magnet.

The Mastermag range accommodates both air and oil cooled coils depending on a customer's specific application. The coils are ducted to maximise heat dissipation by allowing either the oil or air to circulate within the winding. Each electromagnet is supplied with a custom built transformer rectifier to BS EN 60076.

For Electromagnets that are supplied to regions with high ambient temperatures or that will be installed at high altitudes, Master Magnets de-rate their units to dissipate heat and ensure maximum efficiency as well as the longest possible service life.

OPTIONAL EXTRAS

Geared Travelling Trolley

To enable easier cleaning of the magnet system, suspension magnets can be supplied with geared travelling trolleys. The trolley system allows the magnet to be moved to the side of a conveyor for easy removal of collected iron.

RSA Supports

As an alternative to sling chains, RSA supports can be supplied with the Mastermag range of suspension magnets, allowing the magnet to be statically mounted to the customer's support structure.

Master Magnets have over thirty years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Please visit our Website at **www.mastermagnets.com** to view the entire range of Master Magnets Equipment where brochure and video downloads are available.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858/65432 Fax: +44 (0) 1527 65868
Email: info@mastermagnets.co.uk Web: www.mastermagnets.com www.metaldetection.co.uk

MASTERMAG

MASTERMAG

TUBE AND GRID MAGNETS

Tube Magnets are the low cost solution to removing ferrous contamination, they can be used singly or built into grids depending on the application.

Ferrite and rare earth versions are available, including the latest generation of super strength rare earth to give optimum separating efficiency.

Standard sized tubes are kept in stock for immediate delivery, non standard sizes with tapped or plain end are assembled from stock components for quick delivery.

Master Magnets can also provide a range of grid magnets, made from a quantity of tube magnets to produce a more efficient separator.

The grids are available in a range of housings to meet the customer's individual requirements. Optionally a grid can be constructed with an automatic pneumatic cleaning device reducing downtime.

GRID MAGNET RANGE

STANDARD HOPPER GRID

Grid magnets are manufactured from ceramic or rare earth magnetic tubes, they are commonly installed in hoppers, chutes and ducts to benefit mainly food processing, ceramic and plastic industries. Master Magnets can custom build grids without housing to meet the application size and throughput rate.

DRAWER TYPE GRID IN HOUSING– MANUAL

Grids are also available in a variety of housings to suit vertical circular and box chutes, ducts and gravity feeds and as sanitary or dust tight models to suit requirements. They can also be manufactured with drawers to allow for an easier cleaning process reducing downtime.

PNEUMATIC DRAWER TYPE GRID IN HOUSING –AUTOMATIC

Grids can be constructed with a pneumatic automatic cleansing device reducing cleaning downtime even further, to a matter of seconds. Extracted Iron is released via a discharge flap.

For advice on magnet selection contact our team of experienced sales engineers.

Master Magnets have over twenty five years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals processing. The MasterMag range of systems are known for high performance and reliable operations including magnetic separators for metals reclamation, tramp metal protection and high intensity mineral separation.

Visit Our Website at **www.mastermagnets.co.uk** for the entire range of Master Magnets Equipment.

Master Magnets Ltd Incorporating Integrated Recycling Systems Ltd and Metal Detection Ltd.
Burnt Meadow Road, North Moons Moat, Redditch, Worcestershire, B98 9PA England.
Tel: +44 (0) 1527 65858 Fax: +44 (0) 1527 65868 Email: info@mastermagnets.co.uk Web: www.mastermagnets.co.uk

MASTERMAG