



# GLOBAL SOLUTIONS

## NEWS RELEASE

*For Immediate Release*

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### **FOREIGN BODIES IN FOOD – MAGNETIC SEPARATION**

With the increasing pressure to ensure that food standards comply with government guidelines and producers provide consumers with optimum quality products, the Magnetic Separation process plays a vital role in removing ferromagnetic and paramagnetic particles from a process line or product stream.

Continuous improvements in Permanent Magnet technology have resulted in their increasing use to power Magnetic Separators. Since the 1930s, Separators have been used to remove ferrous metal from all stages of production in the Food and Drink Industry. Separators in this industry are invariably powered by permanent magnets of varying strength. The introduction of 'Rare Earth' permanent magnets, which produce twenty times the magnetic power of conventional 'Ceramic' magnets, have extended the use of Magnetic Separators to the removal of very small particles of iron as well as rust and scale.

#### **Principles of Operation**

There are four basic types of Magnetic Separator which are used in the Food Industry to remove ferrous foreign bodies – [Plate Magnets](#), [Tube Magnets](#), [Pipeline Traps](#) and [Drum Separators](#).

Technically, a Magnetic Separator must produce a magnetic field of sufficient strength to magnetise the ferrous particle as well as a magnetic gradient to attract it to the magnet itself through the material being processed. The magnet force acting upon a ferrous particle is the product of the magnetic field strength and the gradient.

For attracting larger ferrous particles such as nuts and bolts, low intensity magnetic fields are sufficient. The magnetic fields for these Separators are generated by 'Ceramic' Magnets, either barium or strontium ferrite. For attracting small ferrous particles as well as iron oxides and certain stainless steels, a higher intensity magnetic field must be used, such as those generated by Rare Earth magnets and demonstrated in the *Xtreme™* RE Magnets product range.

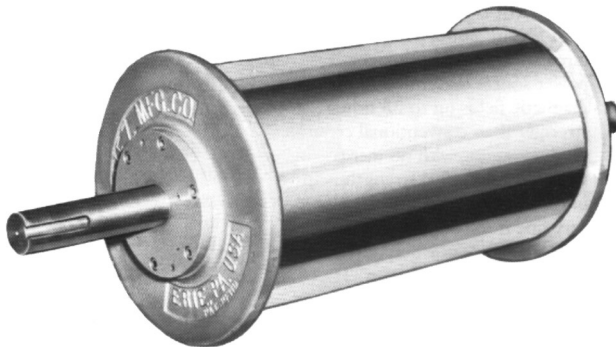
Depending on the application, there are various magnetic separation components available. Plate Magnets, consisting of a rectangular box containing permanent magnets, are commonly installed either in the base of chutes and ducts or above belt conveyors with low to high volume product streams. The depth of material being carried on the conveyor determines the height at which the Plate Magnet should be installed and furthermore, establishes the strength of the Magnet. Plate Magnets are normally hinged when base mounted for ease of cleaning.



[Tube Magnets](#) are constructed of cylindrical permanent magnets contained within a stainless steel tube. Such magnets are installed singly or in multiples within the process, or built into grids, through which the food material flows. The grids themselves can be built into drawer type assemblies for manual removal for cleaning or can be arranged for automatic removal actuated pneumatically. For powders with poor flow

characteristics, e.g. ground spices, the Tubes must be vibrated to prevent bridging of the Tube Magnets and consequential blockage. For ultimate protection, double or triple banks of Tubes are utilised in the flowline, such as those featured in the Grate Model Magnets. Tube Magnets provides versatility, suitable for use with either dry or wet materials and can be individually used for quality control purposes.

For liquids, such as juices and soups, which are transported in pipelines, [Magnetic Traps](#) containing Tube Magnets which protrude transversally to the direction of the flow, are used. For pipelines carrying liquids which must be maintained above a certain temperature, e.g. chocolate, a hot water or steam jacketed Trap is essential. Liquids containing fluids with a significant amount of solid matter, e.g. canned meat products, require a Pipeline Magnet without any impedance to the flow. This is arranged by replacing the Tube Magnets with a Plate Magnet incorporated into the body of the Trap.



A [Magnetic Drum Separator](#) comprises a rotating drum which contains a fixed permanent magnet unit extending approximately 180 degrees around the periphery. Material to be treated is fed to the top of the drum; iron is attracted to the magnet unit and held to the drum as it rotates to the point where the magnetic field ends. The material itself is thrown from the drum by the centrifugal action imparted to it by its rotation. Such Separators are used to extract iron from

dry free flowing ingredients or products, e.g. grain, rice or sugar.

There are multiple variations of Magnetic Separators specifically suited for different applications. However, all have the common goal of improving and protecting food process lines and ensuring product purity.

## Future

With quality guidelines becoming increasingly stringent, the requirement to recover ever smaller particles of iron will inevitably encourage the design and availability of even more powerful Magnetic Separators. Furthermore, it will undoubtedly lead to future developments and innovation in Permanent Magnet Technology.

Eriez is recognized as world authority in advanced technology for magnetic, vibratory and inspection applications. The company's magnetic lift and separation, metal detection, materials feeding, screening, conveying and controlling equipment have application in the process, metalworking, packaging, recycling, mining, aggregate and textile industries. Eriez manufactures and markets these products through eleven international facilities located on five continents. For more information or to request an Eriez brochure, visit [www.eriez.com](http://www.eriez.com) or send e-mail to [eriez@eriez.com](mailto:eriez@eriez.com).