



# P-Rex<sup>®</sup>

## Distinguishes Itself in Energy from Waste Applications

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# P-Rex<sup>®</sup>

### Background

Energy-from-Waste (EfW) facilities produce electricity for millions of homes across North America by recovering energy from waste while providing waste disposal and recycling services. These EfW facilities are designed to integrate with Municipal Solid Waste (MSW) systems to maximize the recovery of energy from waste via a complete combustion process. EfW facilities can also recover metals that are byproducts of its combustion process.

One EfW company reports that its facilities are converting 20 million tons of trash and residuals annually into 9 million megawatt-hours of clean, renewable energy and more than 9 billion pounds of steam sold to a variety of industries. Unlike incineration, a complete combustion process burns MSW as the primary fuel source for energy in specially designed boilers. The controlled combustion process uses state-of-the-art pollution control equipment to scrub emissions and prevent them from being released into the environment.

The EfW process ultimately produces a combined ash comprising two of the byproducts of the EfW process: the bottom ash that remains after combustion and air pollution control residue. The bottom ash that remains after combustion—which comprises approximately 10 percent of the original waste stream by volume—contains valuable ferrous and nonferrous metals. By recovering these metals, recycling rates are improved.

The amounts of metals present in the ash are significant. One company's EfW facilities are reportedly recovering about 430,000 tons of ferrous and more than 15,000 tons of non-ferrous metals from the ash for recycling on an annual basis. That's the equivalent of five times the amount of steel used to build the Golden Gate Bridge and the amount of aluminum in



Deep reach and edge-to-edge pick-up is common to P-Rex.



Powerful magnetic circuit easily recovers heavy meatballs.

more than 1 billion beverage cans. In one report, all U.S. EfW facilities combined are recovering more than 700,000 tons of metals for recycling annually. Yet, some 250 million tons of trash—containing metals—are still going to landfills every year in the U.S. Approximately three percent of the waste stream is metal, so potentially 7.5 million tons of metals are lost.

### Increased Recovery

For many companies, increased metal recovery is a primary objective. There is a defined need to recover more ferrous and nonferrous metals from the bottom ash.

When companies want to recover more metals, they often focus on increasing nonferrous recovery. As part of that process, it is common to conduct ash tests at designated locations to determine the amount of metals remaining in processed bottom ash. Most facilities are set up to recover ferrous metals using a variety of equipment, including various electromagnetic drums, overband magnets or permanent magnets.

High performance facilities stand out among the others as having less ferrous content in the processed bottom ash. When we looked at performance and tried to understand what was different, we found the distinction comes from the utilization of a rare earth magnet.

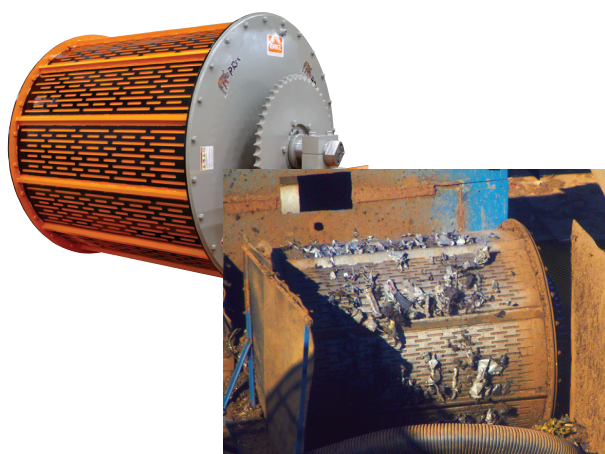
Eriez® believed there were missed ferrous opportunities, as additional performance comparisons continued to indicate recovery differences. The subsequent ash testing that Eriez conducted determined customers were indeed missing ferrous opportunities. Eriez concluded that with the exceptional P-Rex® Scrap Magnet, more ferrous could be captured for our customers.

### Considered Factors

A key advantage with the P-Rex rare earth magnet is its magnetic strength. This strength allows for installation with a greater gap between the conveyor and the drum, where it's better able to deal with the widely varying sizes of metal objects remaining in the bottom ash.

Closer gaps traditionally cause large objects—something like an iron safe—to potentially become wedged between the belt and the magnet, leading to equipment jams or damage. The natural solution is to set the gap higher than what will cause problems.

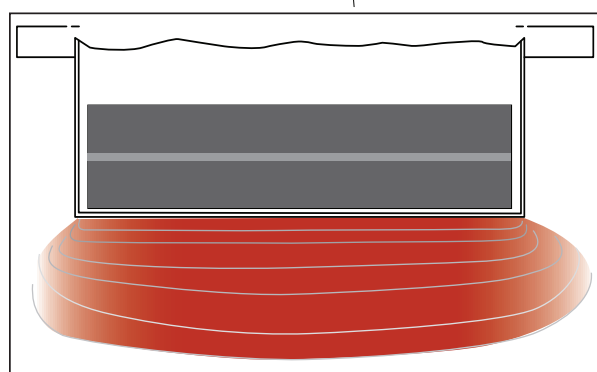
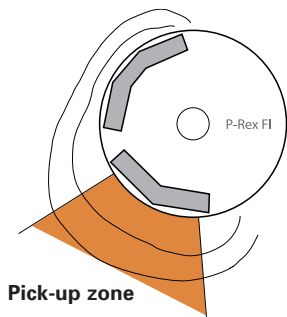
With P-Rex rare earth magnets, users can maintain a gap greater than 9" without a loss in ability to pick up the material.



Traction plate improves cleaning action.

## P-Rex Magnetic Profile

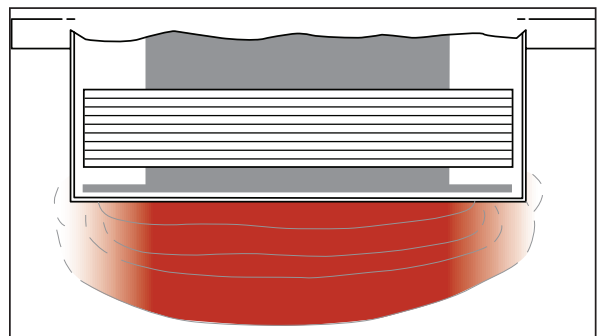
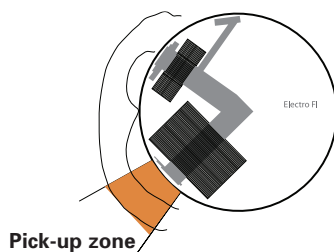
Pick-Up Zone



Edge-to-edge consistent strength.

## Electro - Hot Magnetic Profile

Pick-Up Zone



Weak at the edges.

This is a real competitive advantage because customers can avoid damaging conveyors and operators are spared from dealing with troublesome jams. Achieving the same pickup performance with conventional scrap drums would require the magnet to be a lot closer, which causes safety concerns.

Another key benefit of rare earth magnets is that its magnetic force remains consistently strong across the width of the drum. With some magnets, the force in the middle is greater. Rare earth magnets feature edge-to-edge performance, ensuring ferrous materials located at the sides of the conveyor belt get picked up.

Because the P-Rex is a permanent magnet, it extends to the edge of the drum. That means wider and more efficient separation. Wider separation enables more profits through increased recovery.

### Information about P-Rex Scrap Drums

Eriez' powerful P-Rex Scrap Drum offers unbeatable separation capabilities, bringing more profits to scrap recycling operations. P-Rex enables better metal recovery than ever before thought possible.

Innovative engineering gives P-Rex the advantage in critical performance areas: superior edge-to-edge separation, no "transfer point" drop in magnetic force and no decline in performance due to heat. Prior to the introduction of P-Rex, processors have had to accept reduced revenue because of more limited metal recovery systems.

### Weak Zones

With today's electromagnetic drum magnets, a steel core is used to project the magnetic field. These cores generate a limited magnetic force at the drum edge because the electric coil that is wound around the core takes valuable space across the width of the drum, resulting in weak zones at the edges. These weak zones can amount to 20 percent or more of the surface of the drum.

### Transfer Point Drops

Today's design of electro-axial drums have a significant reduction in magnetic strength at the transfer point, also known as the "flip" point, along the arc of the ferrous material's travel. This results in lost recovery. With P-Rex the ferrous material is powerfully transferred and flipped from magnetic pole to magnetic pole to magnetic pole, resulting in a cleaner product and more recovery.





P-Rex drum magnet stand.

### Heat Rise

Electro drums consume power and generate heat, resulting in a great loss of strength. Checking the gauss strength of the drum at the end of each shift shows an electro drum can lose up to 30 percent of its strength. This can be an even greater issue in summer months and year-round in warm climates.

P-Rex's permanent magnets maintain their strength. P-Rex lasts forever and uses no electricity. It is very strong with an attractive force that surpasses the largest and strongest electro drums on the market today. P-Rex Drums outperforms electro drums by more than 20 percent in both hot and cold conditions.

When drum magnets don't operate at peak performance, large meatballs and knuckles become impossible to capture. When fragments of electric motors and alternators and other items containing copper, aluminum and steel are not captured, money is lost and dangerous fluff fires can occur.

### Conclusion

Major Eriez customers have believed for years that there were missed ferrous recovery opportunities in their energy-from-waste facilities. Over time, performance comparisons continued to indicate significant recovery differences. Through ash testing, Eriez determined customers were indeed missing nonferrous opportunities. Eriez concluded that with the P-Rex Scrap Magnet, more ferrous could be captured for our customers.

### About Eriez®

*Eriez is recognized as world authority in separation technologies. The company's magnetic lift and separation, metal detection, fluid recycling, flotation, materials feeding, screening, conveying and controlling equipment have application in the process, metalworking, packaging, plastics, rubber, recycling, food, mining, aggregate and textile industries. Eriez manufactures and markets these products through 12 international subsidiaries located on six continents.*

*For more information, call 814.835.6000, visit [www.eriez.com](http://www.eriez.com) or email [eriez@eriez.com](mailto:eriez@eriez.com).*

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