White Paper

Eriez Enhanced Platform (EP) for the Xtreme Metal Detector

Improving sensitivities for the most challenging applications

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Introduction

Balanced coil metal detectors have always been negatively influenced by conductive or dense products. This has forced users to accept detection thresholds that are unacceptable or switch to costly unreliable alternative technologies. That is to say, up to now.
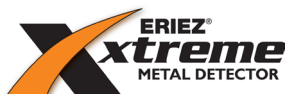
Introducing Eriez Enhanced Platform.

Eriez Enhanced Platform, (EP) is a breakthrough method used for the toughest metal detector applications. In some cases, the technological advances have improved sensitivities as much as 300%.

Eriez superior detection capability can detect smaller objects than the competition.
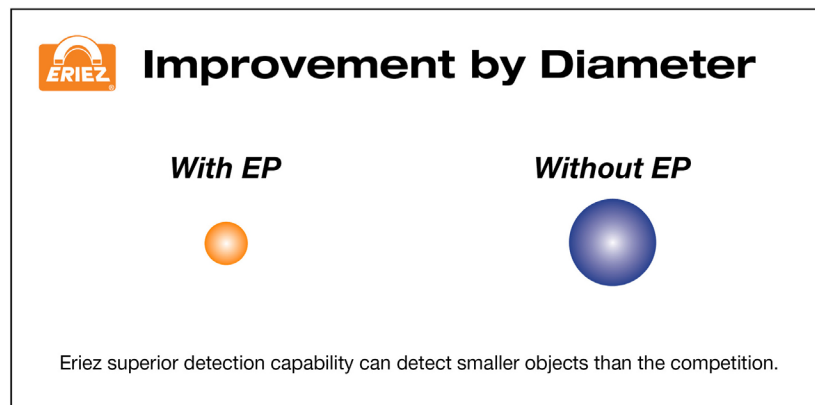
Metal Detector manufacturers define "tough" applications as those with products that create a <u>significant</u> signal in the balanced field….this is known as *product or bulk effect*. These applications include packaged dairy, meat, poultry, beverages and select heavy, dense bags of loose product (such as 50 pound bags).
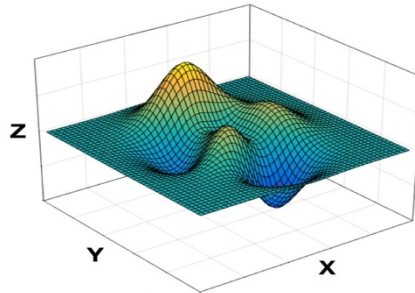
This White Paper will explore the use of Eriez **EP** for these types of applications, how the technology works, what it is and why it was developed.

What is EP and how does it work?

EP is an innovative 3D processing method that examines the <u>full</u> product signal and identifies irregularities. It drastically improves metal sensitivity while reducing false trips.

To understand Eriez' Enhanced Platform, let's explore how a typical balance coil metal detector detects metal. Most balanced coil designed detectors employ 2D boundary detection. Fundamentally, when the metal signal exceeds the product boundary, detection occurs (Fig 1).
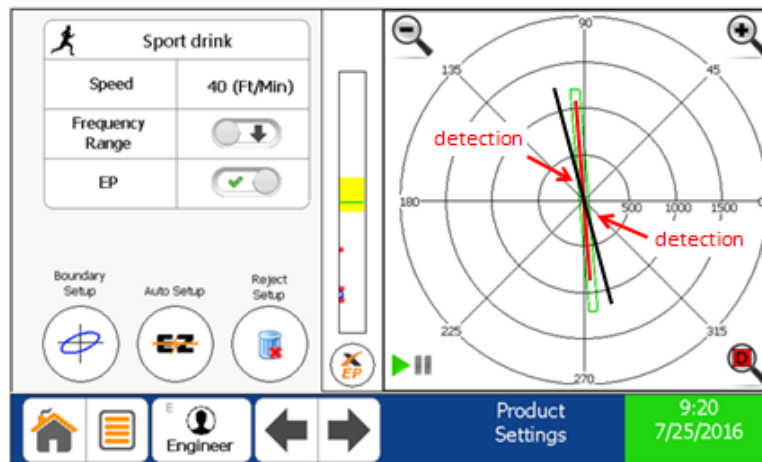

Fig 1

Figure 1 is an image taken from Eriez Xtreme color HMI. The green box is the boundary (phase), the red line is the product (contained within the boundary and "phased out") and the black line represents metal. When the black line (metal) breaches the green boundary (red arrows) a metal detection event has occurred, otherwise known as 2D boundary detection. Inherently, the 2D boundary detection methodology is limited by the effect the product has on the balanced field contained within the metal detectors aperture.

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A balanced coil metal detector is, as its name implies, a balanced field (Fig 2). Therefore, products (especially those that are conductive or dense like cheese, meats or bulk bags) generate significant signals in the field that need to be "phased out" using 2D processing.

Principle of Operation

How the detector works
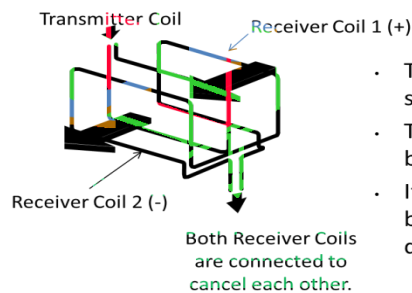
- The **transmitter coil** emits a signal to the + and - **receiver coils**
- The **receiver coils** create a balanced field.
- If metal is in the process flow the balanced field is disrupted and a detection occurs.

Fig 2

So why is 2D processing limited? Recall the image on boundary detection shown in Figure 1. In this scenario, the phase angle of the metal (black) differs from the product (red) and is readily detected. Conversely, in Figure 3, the product (red) has the same phase angle as the metal (black) and is therefore not detected. The metal has been effectively "phased out" with the product.
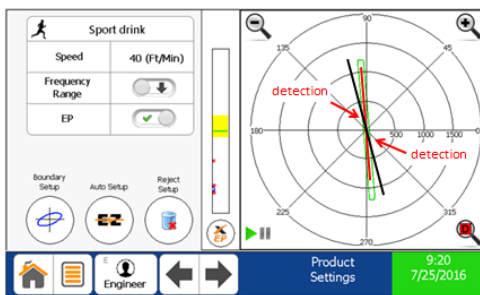

(Fig 1)
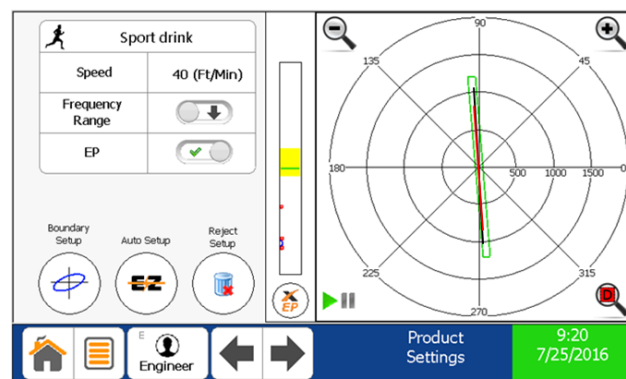
(Fig 3)

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Now, enter EP, a totally new way of detecting.

With the union of the Xtreme state-of-the-art electronics, head design and proprietary software, Eriez has developed and mastered a technique that enables the metal detector to look at a 3D representation of product signals. From this 3D model, we utilize key features about the product that are not visible using standard boundary techniques.

This non-traditional way of looking at metal detection enables our users to significantly improve sensitivities in THE most challenging applications.

Figure 4 is an **EP** screen shot taken from our full color touch screen. The yellow shaded area represents the Calibration Range of the product; this is a dynamic graph that shifts automatically in relation to the variance in product. The green line signifies the detection limit; the red dots below the green threshold line denote "clean" products; the blue dot is the most recent (clean) product that was passed through the detector while the red dot above the line indicates the presence of metal and detection. It should be noted that our Xtreme uses **EP** and boundary inspection concurrently to optimize sensitivities. Two inspections in one.
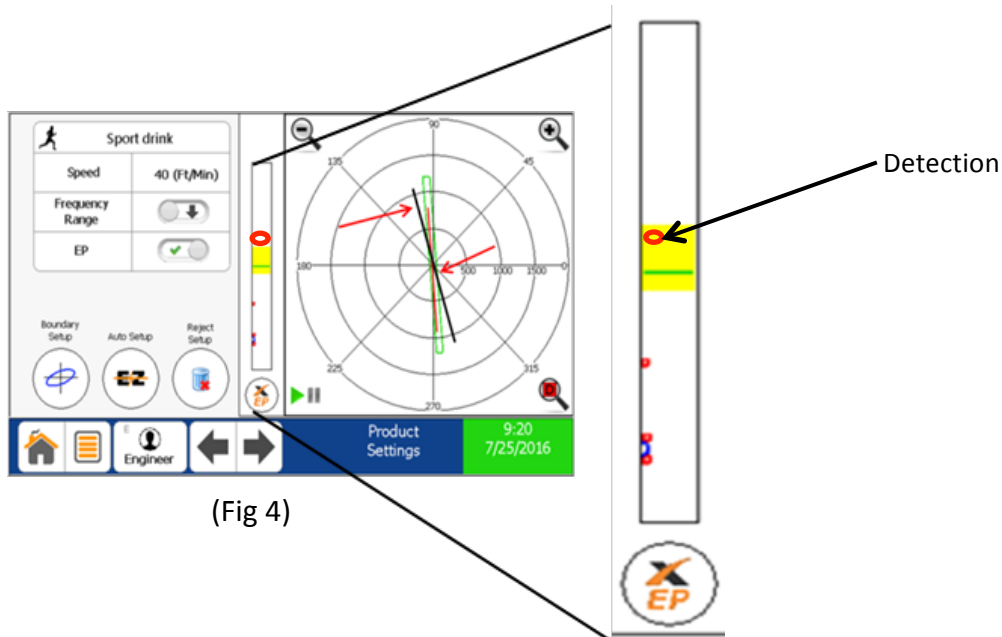
(Fig 4)

Detection

Eriez Enhanced Platform (EP) for the Xtreme Metal Detector
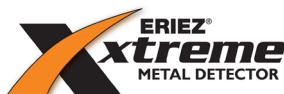
When can EP be used?

Eriez' Enhanced Platform has been specifically developed for production lines with discreet packages that have one full package of spacing from leading edge to leading edge. It is particularly effective when the product constituents are consistent. It is also useful when boundary detection results from your existing metal detectors do not satisfy your current HACCP or Food Safety requirements. **EP** is <u>not designed</u> for use on loose bulk flow conveyors, vertical free-fall or liquid-line applications.

Summary

EP is a breakthrough in 3D processing that examines the full product signal and used for tough metal detector applications. It is a ground-breaking way of detecting metal. EP was developed to help our customers with challenging packaging applications improve their metal detector sensitivities thus mitigating risk/damage to consumers or process equipment. **It is re-defining industry inspection thresholds**.

Eriez welcomes your samples for free testing at the largest testing facility in the industry located in Erie, PA. Please contact your local Eriez Representative to make arrangements.

Eriez is recognized as world authority in metal detection having applications in the food, process, plastics, rubber, metalworking, packaging, recycling, mining, aggregate and textile industries. Eriez manufactures and markets its products through 12 international facilities located on six continents. For more information, call toll-free (888) 300- ERIEZ (3743) within the U.S. and Canada. For online users, visit www.eriez.com or send email to eriez@eriez.com. Eriez World Headquarters is located at 2200 Asbury Road, Erie, PA 16506