Defining Product Effect

Understanding how your metal detector sees your product.

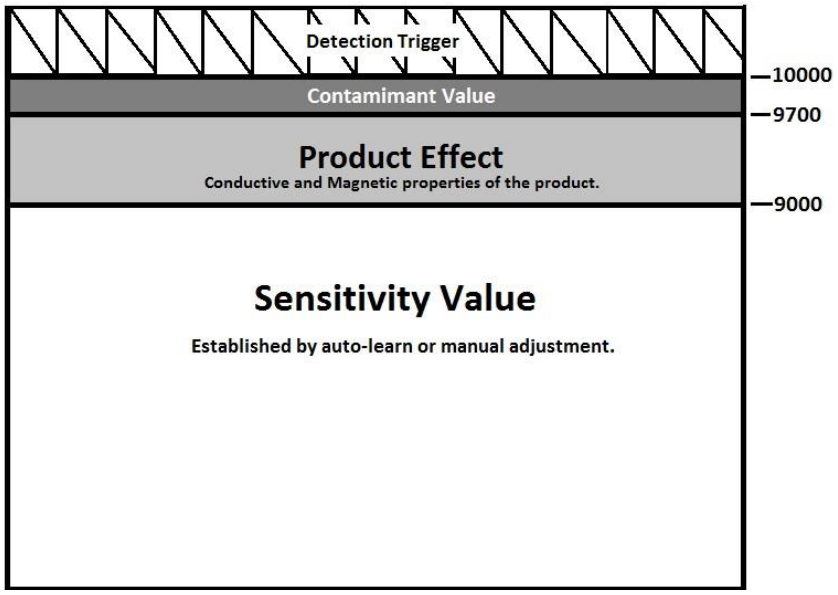
Product Effect is a term used to quantify the magnetic and conductive fingerprint of a product for metal detection purposes. All products have a product effect, and metal detectors must factor the magnetic and conductive properties of the product and the environment into the mathematical equation of determining detector sensitivity and detection capability.

Your specific product, whether it's frozen food or iron ore, has a combination of magnetic and conductive properties, and these properties are measured as the product passes through the metal detector aperture (opening) during the learn process. The processor in the metal detector "learns" these properties and creates a buffer that allows the product to pass through the detector without setting off an alarm.

Product Effect Rule #1: You cannot detect a contaminant whose value is smaller than the Product Effect value. Example: If your iron ore has a product effect equal to a baseball, you cannot detect a contaminant equal to a golf ball.

Metal detectors are designed to trigger at a specific threshold. All metal detectors rely upon the mathematical equation of: ***Sensitivity Value + Product Effect + Contaminant Value = Detection Alarm***

In an ideal scenario, the Sensitivity Value and Product Effect should be just below the Detection Alarm threshold; this ensures that even the smallest contaminant can be detected. Unfortunately, there are several factors to consider, predominately changes in Product Effect. Variations in Product Effect create a larger "gray area" range, causing the Sensitivity Value to be less. This in turn requires the Contaminant Value to be larger in order to have consistent detection.



Product Effect Rule #2: The larger the variation in Product Effect, the less sensitive your detector will be.

The orientation of the product into the aperture can also change Product Effect. Think of a high diver entering the water. If the diver enters the water vertically, the resulting splash is very small. If the same diver does a 'cannonball', the resulting splash is much larger. In this example, the 'splash' is the Product Effect value. As the product enters the magnetic field of the detector, it creates a 'splash' in the field. Since metal detectors operate on a balanced field principle, the degree of 'splash' is what determines if a metal detector is seeing product effect, or product effect AND contaminant.

Product Effect Rules #3: Always orient the product for the worst-case product effect value to avoid false tripping.

And one last tidbit for thought…If your product is supposed to be frozen and is only partially frozen, it will affect your Product Effect values significantly. The more frozen your product is, the lower the Product Effect value will be and the greater your sensitivity will be. Higher temperature products, or hot products directly from processing, will always show greater product effect values. For more information please contact Advanced Detection Systems at 414-672-0553 or visit our website at www.adsdetection.com