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Metal Detector – What Is Sensitivity

Quite often, the first question you'll hear from a customer is "How small of a piece of metal will the metal detector find?" Good question!!!

Metal detector sensitivity is defined as: The smallest diameter sphere that can be detected, 100% of the time, at the weakest spot in the detector aperture. The metal detector's sensing field is weakest at the geometric center of the opening. As you move closer to the perimeter, the field gets stronger and the sensitivity gets slightly better.

There are many factors that affect sensitivity. Among them are; the size of the metal detector aperture, type of product being inspected, the type of metal, and the shape of the metal. There are others, but let's look at these.

Aperture size – As might be expected, the larger the size of the aperture, the weaker the sensing field and the less sensitive the detector.

Type of product – Not only does metal affect the sensing field as it passes through the opening, but also the product will have an effect on the field. The product's moisture content, saline content, fat content, temperature, and mass will all have varying degrees of effect on the field. That's why testing is so important when stating the sensitivity capability of the metal detector.

Type of metal – In the metal detector world there are three type of metal; ferrous, nonferrous, and non-magnetic stainless steel. Ferrous metals, such as steel and iron, are the easiest to detect because they have the most effect on the sensing field. Nonferrous metals, such as copper, aluminum, brass, and lead are almost as easy to detect and have a multiplier of approximately 1.1 times ferrous sensitivity. Non-magnetic stainless steels,

such as type 302, 304, and 316 are the most difficult to detect and will vary greatly with the type of product but will typically have a multiplier of 1.5 times the ferrous sensitivity.

Shape of metal – In the real world, metal contamination does not usually appear in the shape of spheres, except possibly lead shot. They are generally slivers of metal, turnings, wires or broken machine parts. The orientation of the metal as it passes through the detector opening will determine if the sensing field is affected enough to detect the metal. If the diameter of the sliver or wire is small enough it is possible that quite a long piece could pass through the detector unseen. The better the detector's spherical sensitivity, the better the chance that the slivers and wire will be detected.

All of today's metal detectors are affected by the factors mentioned above. So, "How small of a piece of metal will this thing detect?" Good question!!! The answer is "Let's get some of your product into the factory and test it and then we will issue a sensitivity guarantee."