



**Fortress Metal Detectors**



**METAL DETECTION - THE BASICS**

**METAL TYPES AND SHAPES**

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## METAL DETECTION - THE BASIC PRINCIPLES

### Types of Metal

The sensitivity of a metal detector is not the same for all types of metal. For simplicity, we tend to categorise all metals into three types:

➤ **Ferrous:**

Any metal that can easily be attracted to a magnet (Steel, iron, etc.).

Typically the easiest metal to detect and usually the most common contaminant.

➤ **Non-Ferrous:**

Highly conductive non-magnetic metals (copper, aluminum, brass, etc.)

When inspecting dry products these metals produce almost the same signal size as ferrous due to the fact that they are good conductors.

When inspecting wet products, de-rate the sphere size by at least 50%.

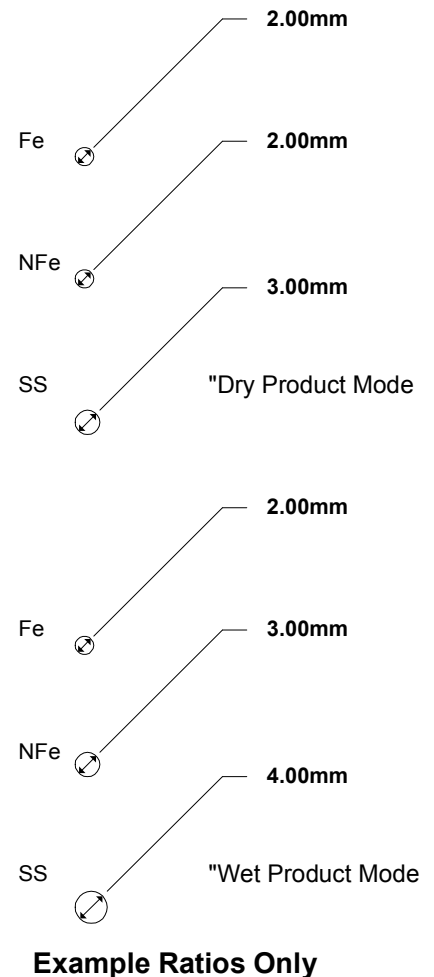
➤ **Non-Magnetic Stainless Steel:**

High quality 300 series stainless steels (Type 304, 316).

These are always the most difficult metals to detect due to their poor electrical conductive qualities and by definition are have low magnetic permeability.

When inspecting dry products a stainless sphere will have to be 50% larger than a ferrous sphere to produce the same signal size.

When inspecting wet products a stainless sphere would have to be 200 to 300 % larger than a ferrous sphere to produce the same signal size.



## Shapes & Orientation of Metal

Metal detection standards are measured in spheres because a sphere is the same shape from any aspect. Real contaminants are rarely spherical and may produce a different signal depending on its orientation when it passes through the detector. The most dramatic example of this is shown by wire contaminants.

With wire shapes, the signal produced will vary greatly depending on the type of metal and its orientation as it passes through the aperture (see image below). In the worst case a wire may produce a signal no bigger than a sphere of the same size as the diameter of the wire.

### **Ferrous Wires:**

**A** – Easiest position, biggest signal.

**B, C** – Hardest Position, smallest signal.

### **Non-Ferrous and Stainless Steel Wires:**

**B, C** – Easiest position, biggest signal.

**A** – Hardest position, smallest signal.

