

Metal Detector belts in the Food Industry

Frequently we have questions about belts useful for metal detectors.

As food safety demand is growing, classic metal detectors are present in every food processing line end every food sub-segment from vegetable, bakery, meat and confectionery.

Everybody knows that belts basically should not be antistatic (AS), but why, and are there exceptions?

The following basic notions will support your daily business:

- Metal detectors are needed anywhere products might be contaminated by metal.
- Although 75-80% of metal detectors are used in food related industries, many non-food industries (rubber, plastic, aggregate, mining, wood, textile, glass, product and environmental security) use them as well.

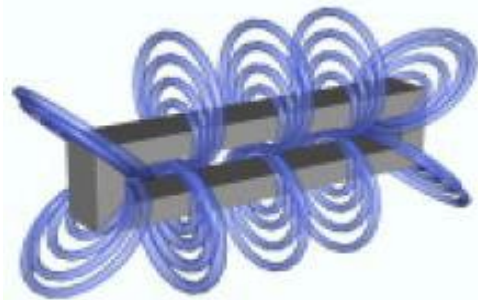
Metal detector usage can be broken into three main categories:

- **Packaging** – where higher sensitivity (the smallest piece of metal) is desired,
- **Bulk Processing** – where gravity drop or pipeline metal detectors are used to protect equipment (e.g. blenders, mixers, cutters, choppers, etc.),
- **Industrial** – where industries have lower sensitivity requirements (mining, aggregate, rubber, plastic, etc.).

Theory of operation

All metals are either magnetically conductive, electrically conductive, or both. When they enter an electro-magnetic field, they create a detectable disturbance or signal.

Modern metal detectors operate on balanced coils; a full loop system that allows this signal to be detected. Balanced coils are made from a ring frame with a crossing belt. The complex design of this conveyor system creates a need to endless the belt on the conveyor frame onsite.



Balanced magnetic coils on a MD frame

Coils are in a static-shielded head looped around the ring aperture through which product passes. The head houses a transmitter coil that broadcasts a radio frequency signal and generates an electro-magnetic field. On either side of that transmitter coil are two equally spaced receiver coils. Signals from the receiving coils are connected in opposition to each other, and, when no disturbance is present, the net signal across the coils is zero – they are balanced. It is the electrical equivalent of a balanced weight scale. This balance is disturbed as metal contamination enters the aperture, and again as it exits the aperture.

The control electronics amplify and analyse the disturbance, then indicate a “detection” if the signal generated is greater than the sensitivity threshold.

Practical tips

The magnetically balanced coils are disturbed by Anti-Static (AS) belts. The interrupted carbon ends of AS synthetic belts disrupt the magnetic field of the balanced coils.

Metal Detectors in food industry usually have a very high sensitivity level.

The food industry frequently has large amounts of oil, grease and liquids that discharge the static electricity to the sliderbed. Therefore, it is possible to input AS belts due to “wet environments” that are conductive. Though, in dry conditions this cannot be done.

Metal polluted splices are rarely the problem behind a claim for a Metal Detector belt.



AS carbon warp ends interrupted by straight finger splice

Please select non-AS Synthetic belts.

Modular, Soliflex, AmDough and Ultrasync belts do not affect metal detectors as they are not anti-static without conductive parts.