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Magnetic Separators and Metal Detectors for Pet Food

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When manufacturing pet food, it is of vital importance to remove metal contamination from the processing line to ensure the final product is metal-free. Pet food containing metal contamination can severely harm animals, resulting in expensive vet bills for the customer and a damaged reputation for the brand that sold the contaminated food. As another concern, metal contamination is notorious for causing significant, costly damage to other equipment within a facility. For these reasons, metal contamination must be removed from pet food in a processing line before it is sent out as a final product. To achieve this, it is recommended that pet food manufacturers install a comprehensive metal removal system within their facility that includes both magnetic separators as well as metal detectors.

For the sake of this white paper, "pet food" will refer to commercially available pet food for dogs and cats. While there are other sectors of the pet food market, for example those catering to birds, fish, reptiles, and small animals such as hamsters, these markets will not be the focus of this piece.

Different Types of Pet Food and Ingredients

There are more different varieties of pet food available on the market now than ever before. Wet canned pet food and dry kibble are still the most popular types of food for dogs and cats, but specialty diets including raw food, freeze-dried food, meal toppers, and even fresh and human-grade foods have grown in popularity, especially in the past few years.

Just like their wild ancestors, dogs and cats require diets primarily consisting of meat. Typically, pet food for dogs and cats will contain a standard meat such as beef, chicken, or salmon in addition to meat by-products, fats, and meat meals. Dog and cat food is commonly supplemented with grains such as corn, barley, rice, wheat, and grain meals. It is also common to see fruits and vegetables such as carrots, apples, blueberries, green beans, and peas.
Meat

Beef, chicken, and fish are all easily recognizable ingredients on a pet food label. While not the most appetizing, the consumer also has no problem reading off ingredients such as "chicken liver" and "sardine broth." Ingredients such as "meat by-product," "beef and bone meal," and "chicken by-product meal" are also commonly found in commercial cat and dog food, but are not as easily identifiable. These "meal" and "by-product" ingredients are sourced from animals (including fish) or parts of animals considered undesirable or unfit

for human consumption. For example, a "meat by-product" may include organ meat, tissue, bones, fat and other parts of animals that are highly nutritious to pets, but that humans typically do not consume. Commonly, these animals and animal parts are sourced from stockyards, butcher shops, and even restaurants and grocery stores. For example, in a stockyard processing cattle, "waste" parts are separated from the main process and sorted into bins. These bins will then be sent to a rendering facility, where the material is then cut, crushed, and ground, significantly reducing the size of the raw material while simultaneously eliminating liquid.

Metal Contamination Originating from Meat

When meat is being processed, there are numerous possible points of entry for metal contamination. The first source of metal contamination often originates from the animal itself in the form of identification tags, hooks, broken antibiotic needles and syringes, and any metal the animal may have ingested. Cows in particular are known for swallowing small foreign objects, which can often include nails and wire. Metal contamination can also occur during slaughter, initial processing, and transfer of meat. Meat processing plants and rendering plants utilize wear-prone machinery, such as grinders and sieves, and as equipment wears away or has pieces or parts break off, that metal then goes on to enter the product stream. Due to this, it is strongly recommended that all meat material passes through a metal detector immediately upon arriving at the main pet food processing plant. Meat is more likely to contain stainless steel contamination, which is why a metal detector is recommended in this scenario.

Grains, Fruits, Vegetables, and Metal Contamination

Other ingredients, such as grains, fruits, and vegetables, are subject to the same metal contamination concerns as meat. As raw bulk grain material enters a plant from a truck or rail car, there is a high likelihood that there is metal contamination hidden within it. The contamination is typically ferrous metal, originating from machinery or stray nuts, bolts, etc., that may have broken off or otherwise entered the raw material. As this type of material typically includes ferrous metal contamination, it is recommended that it passes through a magnetic separator before going through a metal detector in order to improve efficiency.

Metal Contamination and Equipment

Metal contamination also frequently originates from other equipment in a processing plant. As equipment in a pet food processing facility experiences wear and tear, metal fragments and metal items such as loose screws, bolts, and other machine parts can fall into the product stream. When processing equipment such as grinders and crushers experience environmental factors such as general abrasion and vibration, it is common for equipment pieces such as nuts, bolts, and blades to break off or come loose. Metal-to-metal wear is another problem that results in metal particle contamination, as in the case of two metal parts grinding against each other. Even the simple act of scraping a pan with a metal instrument can lead to tiny metal particles entering a product stream. Loose metal may also enter the product line as a result of a repair job that caused metal to be dropped onto the line. Since most equipment in pet food processing facilities is made of metal, there is a very high probability that this kind of foreign body metal contamination will occur.

If metal contamination is not removed from ingredients promptly upon arrival, the initial metal contamination can aggravate wear and tear on equipment and even cause direct, severe damage to equipment. The result becomes an even greater amount of metal in a processing plant as equipment deteriorates at a faster rate, more metal enters the product flow, and equipment downstream becomes damaged and deteriorates at a greater rate as well.
Metal contamination is of particular concern to dry pet food manufacturers due to their use of extruders. If metal contamination remains present in material that has entered an extruder, there is the risk that contaminant particles will damage the die of the extruder. If the die comes into contact with metal contamination, it can become damaged and continuously degrade over time, leading to additional metal contamination entering cereal as it is extruded. This leads to a compromised product shape, an interruption to the process, and a risk for continued damage down the line.

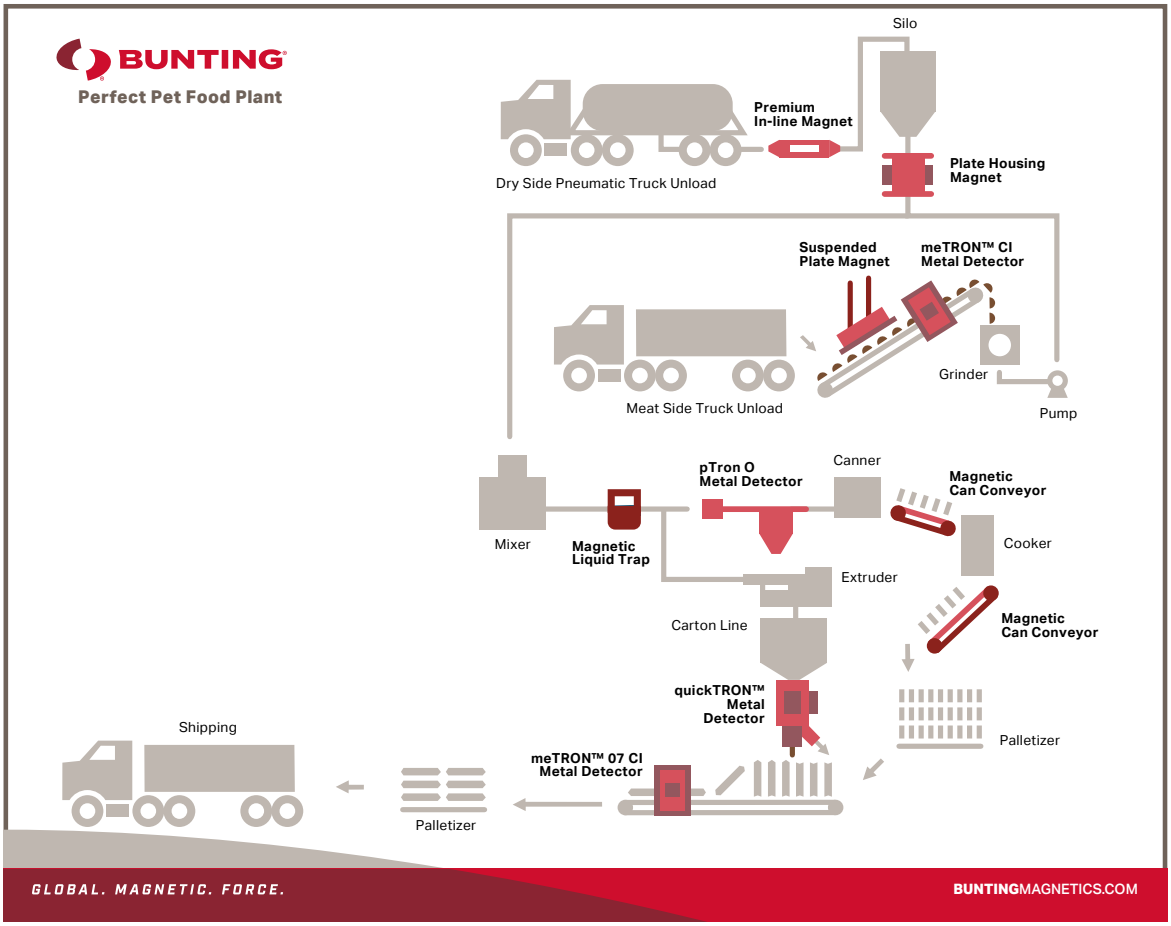
Consequences of Metal Contamination

A failure to remove metal contamination at even a single critical point leads to a domino effect that results in greater and greater amounts of metal contamination entering a processing system. This ultimately results in extensive damage to equipment, profit and productivity lost as a result of downtime, and damage to a manufacturer's brand name and reputation should a customer's pet consume a contaminated product.

Cost Efficiency and Investment Payoff

The upfront cost of investment in preventative magnetic separation and metal detection equipment is minimal compared to the expenses metal contamination can cause. Metal contamination can cause thousands of dollars worth of damage to manufacturing equipment in a facility, and the cost of repairs is accompanied by the significant cost of downtime and lost production. Additional financial consequences can be seen in lowered stock values and loss of profits caused by brand reputation being harmed as a result of customers encountering metal contamination in products.

Bunting Magnetic Separators and Metal Detectors for the Pet Food Industry



Placement of magnetic separation and metal detection equipment must occur at the most critical process points. For the most rigorous standard of metal contaminant removal, it is best to install magnetic separators and metal detectors before and after key processing equipment such as extruders. Magnetic separators are most critical early on in the process, as they excel at removing the ferrous contamination most associated with ingredients that

have not yet undergone extensive processing. Metal detectors are highly valuable due to their ability to detect stainless steel, which is a predominant material used in food processing equipment. Installing magnetic separators and metal detectors at multiple points in a processing line not only removes contamination, but can also provide valuable insight to places in a processing line where equipment may be deteriorating or failing.

Magnetic separation and metal detection equipment is typically unobtrusive, and integrates easily into an existing process line. Selecting equipment depends on various factors, such as whether the other equipment in the facility is primarily constructed of stainless steel metal or ferrous metal. For example, if the majority of a plant's equipment is stainless steel, metal detectors will be recommended over magnetic separators. Another factor is the retention of good product. Magnetic separators remove only the ferrous metal contamination, with little if any waste of product. Metal detectors use a reject mechanism that will reject the contaminant along with a small amount of good product. Many companies today install magnetic separators ahead of metal detectors to reduce the amount of good product rejected. Depending on the way material is being conveyed, pneumatic and gravity free-fall magnetic separators and metal detectors are both available for manufacturers to install.

Bunting HFS Series Drawer Magnet and Grate Magnet

Bunting "Bulk Bag" Metal Detector

Bunting is a leader in the food processing industry, providing the highest quality of magnetic separation and metal detection equipment. The company offers extensive custom design options for equipment, as well as comprehensive ongoing customer support. Bunting offers magnetic separators and metal detectors designed to solve unique tasks. For example, the meatLINE™ metal detector is designed specifically for use handling meat, and its unique reject mechanism allows it to remove metal contamination without sacrificing the integrity of the ground meat. Bunting's "big bag" metal detector, the meTRON™ 07 CI coil Metal Detector with Bulk Sense Kit, is a tunnel style metal detector that features a special construction designed specifically for bag inspection. It is an ideal metal detector for handling items such as large bags of dry kibble.

Conclusion

Magnetic separation equipment and metal detectors are highly valuable to customers in the pet food processing industry. Metal contamination can enter a pet food manufacturing facility's product stream from many sources, and combining magnetic separation equipment with metal detectors ensures comprehensive removal of ferrous metals, non-ferrous metals, and stainless steel. By investing in and properly maintaining magnetic separation and metal detection equipment, customers in the food processing industry will avoid the costly damages to their equipment and reputation that metal contamination can cause.

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