FSMA Compliance: How Separation Technology Gets — And Keeps — You There

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Are you confused about how to apply new FSMA regulations in your food processing plant? If so, you are not alone. While the vague regulations allow you to make the best decisions on product purity and equipment protection for your business, the downside is the uncertainty about exactly how to do that. Are you making the right decisions? Are you using the tools correctly? Will the FDA agree with your decisions?

Separation technology is one class of tools commonly used in the food industry to remove metal contaminants. What follows is a simple plan to help keep you compliant with FSMA regulations, including best practices, common mistakes, and recommendations for how to implement magnetic separation equipment properly.

PERFORM A PULL-TEST AUDIT ONCE PER YEAR

An effective separation technology program requires periodic verification of magnet performance. Don't make the mistake of placing your magnets and forgetting about them. The industry's best practice is to perform a pull-test audit of all magnets in your plant at least once per year. This will help guard against a lapse in protection and keep you compliant with FSMA regulations.

The pull test measures how many pounds of force it takes to remove a half-inch ferrous ball from the magnet being tested. The strength of a magnet varies based on the type of magnet, as shown in the graph below. If a magnet is not working or has lost strength from cracking, impact, extreme heat, or even improper installation, the pull test will detect the lack of strength. Your test should show similar strength as when the magnet was installed. When magnets show signs of losing strength, replacement may be necessary.

To perform the pull test, you can either hire an independent magnet auditor or perform the test in-house using a purchased test kit. More information about how to properly perform a pull test can be found here in the test kit instructions.

From our experiences performing pull test audits, Bunting Magnetics Co. has observed several common mistakes with the implementation and use of separation technology. These mistakes can leave your food supply and equipment vulnerable to metal contamination, causing damage to your product, reputation, and processing equipment. Four recommendations to keep your magnets working effectively are:

1. Don't ignore the importance of routine magnet cleaning and inspection.

   Magnets covered with too much ferrous material lose effectiveness. A recommended best practice is to specify cleaning procedures in either your quality assurance or maintenance procedures for all magnetic equipment. Procedures should specify the cleaning frequency as well as a reporting mechanism for the cleaning person to report magnet damage or suspected loss of magnet strength. Two signs of a damaged or ineffective magnet are an inability to attract metal or a rattling sound inside the magnet. Finally, cleaning procedures should also include a supervisory check to ensure the magnet cleaning procedures are being followed.

   The recommended method for cleaning a magnet is to slide the ferrous material off using a heavy-duty leather glove. Common mistakes in cleaning include banging the magnet against the wall, which can destroy the magnet and diminish its effectiveness; using high-pressure water or air, which pose health and safety risks and do not clean effectively; or using unprotected hands, which can lead to metal becoming embedded in the hand.

2. If pull testing is performed in-house, purchase a testing kit from a qualified vendor.

   Beware that some pull test kits are not accurate due to poor construction or no calibration. Digital scales should have NIST certification with serial numbers matching the scale. These scales should be certified annually. When testing, be sure to perform three pulls per cartridge and take the average of all three for the final result. You are looking for repeatable results.

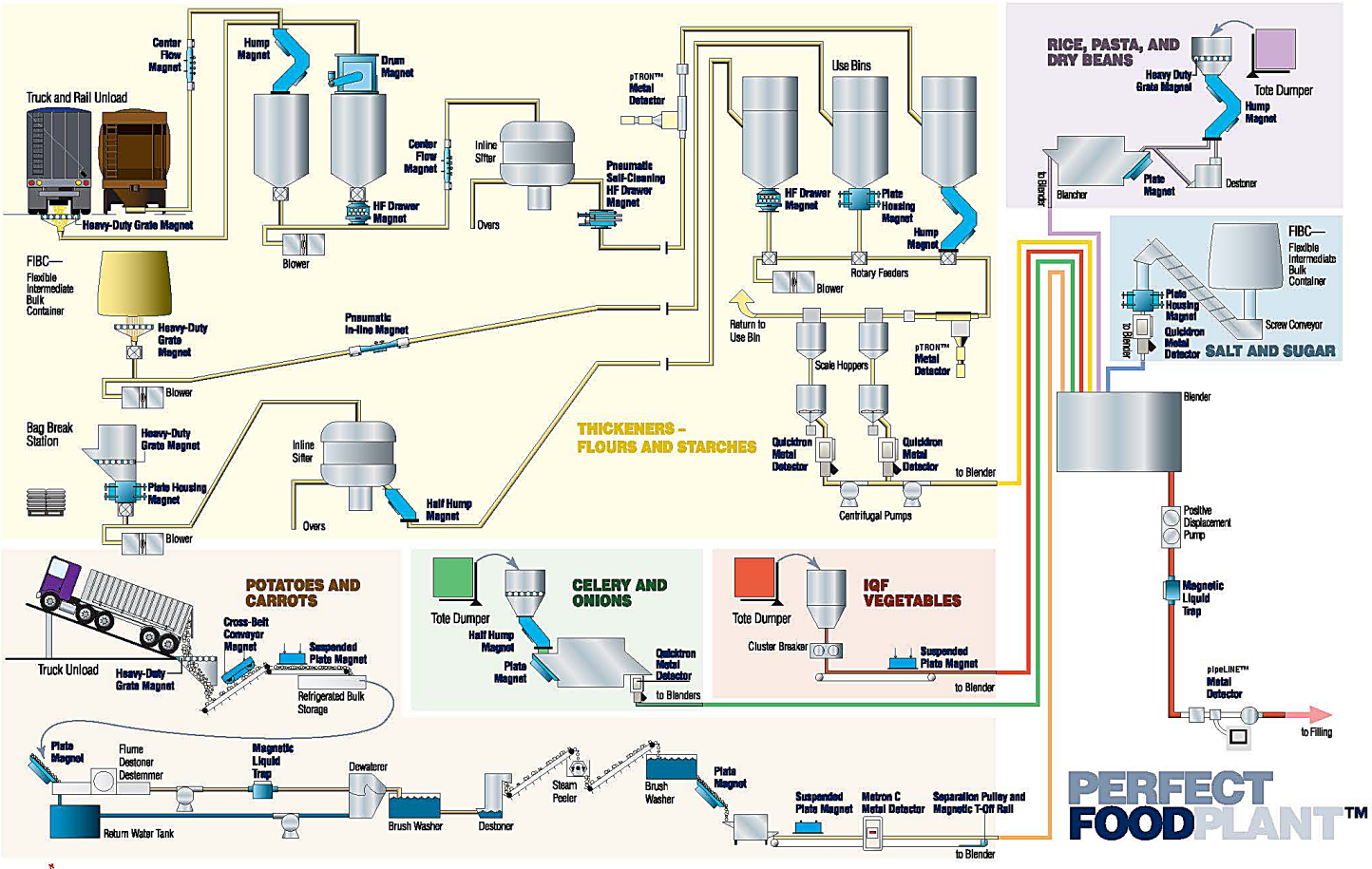
3. Avoid heat damage to magnets.

   Magnets can be damaged by exposure to high heat from welding or high-temperature cleaning. The temperature at which damage occurs varies by the type of magnet, as shown in the chart above. Damage for some Rare Earth Neodymium magnets can occur at 180 degrees Fahrenheit.

PROTECT THE CRITICAL POINTS IN YOUR FACILITY

A best practice is to have multiple magnetic checkpoints during processing, including: at intake, at conveying, and at the final phase of production. The use of specific magnet types at multiple critical points throughout your plant is illustrated in the perfect food plant illustration below.

The first critical checkpoint is at ***intake of vendor products.*** After being harvested, products are delivered by a semi-truck or rail car. Any foreign (ferrous) material that may originate in the harvested field or introduced during transport could enter the plant at this point. It is not unusual to find pieces of metal fence, baling wire, tools/broken tool parts, or foreign material that may have fallen from a tractor. A ***ceramic grate magnet*** is recommended at this point of entry to the plant to prevent large pieces of ferrous material from entering your product stream or damaging your equipment.



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A second magnetic checkpoint at the ***conveying process*** is recommended. There are four different methods of conveying product. The recommended separation technology depends on the conveyance type:

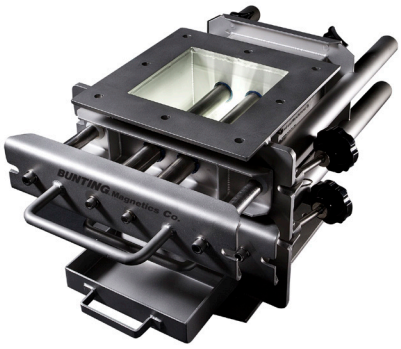
- A ***pneumatic in-line magnet*** is recommended for pneumatic conveying
- A ***self-cleaning drawer magnet*** is recommended for gravity-free fall conveying
- A ***hump magnet*** is recommended for chute-style movement of products
- A ***magnetic liquid trap*** is recommended for pumped liquids

A final product magnetic checkpoint is recommended at your ***final phase of production*** and prior to the product leaving your plant. At this point, a very strong neodymium ***rare earth magnet*** is recommended.

USE THE RIGHT MAGNET AND INSTALLATION FOR THE RIGHT APPLICATION

Many users don't realize magnets are application-specific. To be effective, a magnet needs to have both the proper strength (see chart below), reach-out (i.e., the ability to reach through the product stream to attract the contaminant), and be properly installed. Choosing the wrong magnet can cause compliance trouble.

For example, Bunting Magnetics Co. recommends horizontal installation of the pneumatic in-line magnet to catch the most ferrous contamination. Installing this magnet vertically is a common mistake and only recommended when the magnet is within 2 feet of a 90-degree bend.



In another example, for magnet effectiveness, a magnet must be in direct contact with the product. Installation on the outside of a chute is often a solution to make cleaning easier. However, this is a serious problem in the eyes of regulators. Any time there is material between a magnet and its targeted product, the magnet's force is diminished by half. Thus, a magnet installed on the outside of a chute, instead of on the inside, has reduced pull strength by 50 percent.

Following this simple plan will help keep you in compliance with the new FSMA regulations, and more importantly, help ensure your food products are free of ferrous metal. To learn more about metal separation technologies and keeping your food supply safe, contact us at https://buntingmagnetics.com/. •

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About Bunting Magnetics Co.

Since the company's 1959 founding, Bunting® Magnetics Co. has led the industry in innovation, durability, and performance in its line metal detection, magnetic separation, and material handling equipment as well as printing cylinders for several global markets: recycling, food packaging and processing, feed and grain, plastics, pharmaceuticals, chemicals, offset printing, metal stamping, automobile manufacturing, and more. Bunting Magnetics Co. Global Headquarters are located in Newton, Kansas with facilities in suburban Chicago, Illinois; DuBois, Pennsylvania; Redditch, England, and Berkhamsted, England.

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