MAGNETIC TERMINOLOGY

GAUSS: A measurement of the amount of magnetic lines of flux in one square centimeter .

REACH OUT: How far a magnet can effectively pull a given piece of steel to it's face. (measured in distance from the magnetic poles)

HOLDING VALUE: How many pounds of force it takes to remove a piece of metal from a magnet.

MAGNETIC CIRCUIT: A certain combination of magnet material & steel pole pieces to achieve either high holding value at magnet's face or optimum reachout.

AIR GAP: Any material or space between the magnet and ferrous material. The magnetic field decreases dramatically with air gap.

TRAMP METAL: Any undesirable ferrous material that has become intermixed with the product being processed.

BURDEN DEPTH: The depth of the product that a magnet will have to effectively reach through to capture metal.

FORCE INDEX: A measurement of the force a magnet can exert on an object within its field.

THINGS TO CONSIDER BEFORE CHOOSING A MAGNET:

MAXIMUM LUMP SIZE (Consistency of Material) - Is the material that you are processing consistent or variable in size?

BURDEN DEPTH (Depth of Material) - What is the depth of the product flow as it travels through a chute or conveying process? This information is critical for designing a magnet that will effectively reach through the product flow and capture metal.

VOLUMETRIC FLOW RATE - What is the volumetric rate of your product flow as it travels through your processing system? This information will aid in correctly sizing a magnet that will offer your product maximum magnetic exposure.

ANGLE OF REPOSE - What is the minimum angle you can have to maintain product flow?

BRIDGING TENDENCIES - What is the moisture content of your product? Does it have a tendency to cake, clump, or stick together? This characteristic often causes the product to have difficulty flowing through a standard grate magnet. Alternate tube spacing or magnet design may be required.

TRAMP METAL CAPTURE - Is your main concern equipment protection; capturing large ferrous metal items like nuts, bolts, screws, paper clips, etc? Or do you need to purify your product from all fine particles of ferrous metal? Your objective will influence the type of magnetic material that is used.

SPACE CONSTRAINTS (The shape and design of the magnet) - What are the space constraints you need to work within in order to accommodate the magnetic equipment? Depending on your available space, you may require a magnet custom designed for your application.

WEIGHT OF MAGNET - What effect will the weight of the magnet have on your existing processing system? Is there a weight limitation or will additional framework be needed to support the magnet?

CLEANING / ACCESSIBILITY TO MAGNET - How is the tramp metal to be removed? In the case of manual clean, will your employees have easy access to the magnet, and will it be easy enough for them to clean regularly? Keep in mind that rare-earth magnets are very difficult to clean manually.

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THE SEVEN MAJOR MAGNET MYTHS

MYTH 1: When deciding between two magnets, whichever one has the highest gauss level reading should be your determining factor.
FALSE: Although gauss readings are commonly discussed on magnets, gauss (lines of flux per surface area) is an inexact measurement and is not repeatable. Many factors which have nothing to do with the magnet can affect gauss readings. A practical, functional test, such as pull strength, will give the customer a better idea of the magnets ability to remove the tramp metal from their product stream.

MYTH 2: Force Index is the only reliable way to determine which magnet will do a better job attracting metal
FALSE: It is important to understand that Force Index readings are calculated solely from gauss. If gauss readings are inexact or inaccurate, then it is evident that any calculations taken from these measurements would also be erroneous.

MYTH 3: All Rare Earth Magnet Material is the same.
FALSE: There are many types and grades of rare earth magnet material as well as many different suppliers of magnet material. Rare earth magnet materials are measured by their energy product which is expressed in mega-gauss oersteads or MGOe. There are many common grades ranging from 27 MGOe to 50 MGOe. Even within the commonly used grade designations, the chemistry and process involved in making a rare earth magnet affect its corrosion resistance and temperature coefficient and therefore its long term life. Some suppliers of rare earth materials do not necessarily adhere to the Magnetic Materials Producers Association (MMPA) standards for rare earth magnets.

MYTH 4: Rare earth is weaker at a distance than Ceramic.
FALSE: When comparing two of the same size pieces of Rare Earth and Ceramic, Rare earth is the stronger material, whether at the magnet face or at a distance. The above misconception may have it's origins from the manufacturing of very large magnets. Neodymium is still very difficult to work with. The material does not stack as easily as ceramic, and due to the high cost of the material, it is not economically sound to do so. Therefore, when reachout for large tramp metal items is the objective rather than holding onto small fines, Ceramic is virtually always used as the most cost-effective solution.

MYTH 5: A Magnet is only insurance.
FALSE: Magnets are a proactive piece of equipment that will solve a product purity problem. Capturing large nuts, bolts, paper clips, or staples to fine metal wear residue originating from your processing equipment, magnetic separators are where product purity is a must. In addition, they will protect sensitive and expensive equipment from damage.

MYTH 6: Magnets will always get 100% of the tramp metal out of a product flow.
FALSE: Many factors contribute to the effectiveness of a magnet, such as product density, consistency and granulated size. It is very difficult for a magnet to pull a piece of metal from behind a large, dense lump of product. In addition, since magnets are designed around a particular application, any changes to that system such as an increase in volumetric flow rate or size of material, can negatively affect the performance of the magnet.

MYTH 7: A magnet is a magnet is a magnet.
FALSE: There are many factors that affect a magnetic device's ability to perform a function for the customer. The internal circuitry has a major impact on the strength of a magnet at the working distance it is designed for. The amount of magnet used in the same type magnet will vary from supplier to supplier and this will have a significant effect on the effectiveness of the magnet. The quality of the magnet material itself can be a contributing factor to how well the magnet will perform.

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