



How To Select A Magnetic Can Conveyor For Your Food Manufacturing Operations

By Donald Suderman

Magnetic can conveyors have been a core element of food manufacturing operations — elevating cans to all floors and operations of a plant — for decades. Though the function of magnetic can conveyors is straightforward, there are specific criteria, and nuances within those criteria, to consider when selecting and customizing the right magnetic can conveyor, and choosing the right vendor, for your facility.

If all divisions of a food plant — production, packaging, labeling, inspection, etc. — were on the same horizontal plane, conveyors might not be a necessity. However, manufacturing floor space is valuable, and to increase efficiency, plants have grown more and more vertical. Further, magnetic conveyors provide efficiency and convenience for single-floor operations. By elevating cans with conveyors above the plant floor, food manufacturers no longer need to load cans on pallets and move them with forklifts. This adds value to the operation by improving worker safety, lowering labor costs, increasing production speeds, and increasing operational convenience and efficiency.

Conveyor Components And Functionality

Conveyors add safety, efficiency, and convenience to food manufacturing operations, but how do they work? A set of customizable parts work together to get cans from point A to point B. Here's how:

BELTS

In the food industry, magnetic can conveyors use two types of belts: rubber/neoprene and modular plastic mat top belts. Each type of belt has its own pros and cons.

Rubber/neoprene belts are thin. This is advantageous because there is less magnetic gap between the belt and the magnet, which allows the conveyor to be more vertically integrated and installed with steeper inclines than mat top belts. This allows the conveyor to use less floor space.

Mat top belts are thick and have larger air gaps in front of the magnet than rubber/neoprene belts. Because of this, the belt and magnet don't have as much

hold as their thinner rubber/neoprene counterparts and, consequently, don't have as much flexibility in steepness and vertical integration.

However, if a plastic mat top belt encounters a problem or tears, the malfunctioning/damaged section can be removed and replaced. If a rubber/neoprene belt becomes damaged or malfunctions, it's often necessary to replace the entire belt.



Neoprene Belt



Mat Top Belt

MAGNETIC RAILS AND CONVEYOR FRAMES

Belts ride along the conveyor atop a piece of stainless steel called the slider bed. Below the slider bed is the bar magnet or magnetic rail that is bolted into the frame of the conveyor. Two types of magnetic rails are used in conveying: ceramic (made from strontium ferrite magnets) and neodymium iron boron magnets. Both types of magnets, like belts, also come with pros and cons.

Neodymium magnets are much stronger than ceramic magnets, which allows high production speeds on mat top conveyors. This makes them an ideal choice for heavier-weight cans and for production lines of 600+

CPM (cans per minute) for full cans and nearly 1,000 CPM for empty ones. However, neodymium magnets are more expensive than ceramic magnets.

Ceramic magnets are weaker than neodymium magnets, but they are more economical. Generally, ceramic magnets will be utilized on the fabric-belted conveyors, lower-speed belts, and at lower angles than the neodymium magnetic rails. Both types of magnetic rails are easily replaceable in the conveyor frames.

MAGNET STRENGTH AND CONVEYING SPEED

In the food industry, six to eight different strengths of magnet rails are used in conveyors. The strength of the magnet is widely dependent upon the volume of the product, the type of product, and the necessary speed for the product to move. For example, a tuna can is relatively flat, light, and holds a small volume of finished product. It would require a magnet of less strength than a gallon can of corn. Further, with tuna cans, conveying 600 CPM, sometimes even completely vertically, is common. But with larger cans, stronger magnets are required due to weight. Consequently, production volumes of these larger cans slow to around 250 CPM, and the ability to traverse inclines is hindered to around 30 degrees.

A single chain of conveyors in a food manufacturing environment will often have multiple types of belts and magnets to accommodate different stages of production. For example, empty cans being brought horizontally along the plant floor to a filling station may be conveyed on a lightweight frame and sliding bed using a mat top belt and a ceramic magnet rail. Once filling is complete and the can is sealed, the cans will be conveyed upstairs or overhead over to labeling. But, because the cans are filled with product, significant weight has been added and a stronger — and wash-down-compatible — stainless steel frame and stronger magnet will be needed. Additionally, because the product is heavy and needs to be conveyed vertically,

a rubber/neoprene belt will also be required.

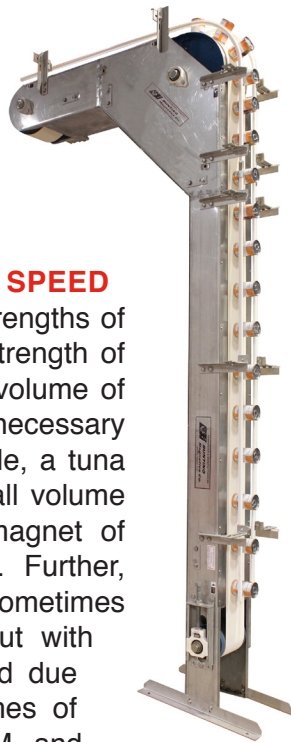
Conveyor Selection Criteria

Food manufacturers looking to invest in a magnetic can conveying system have a lot to consider.

What is being conveyed, the size of the can, the weight of the can, belt speeds, cans conveyed per minute, and the total distance and elevation gained are crucial elements of designing a functional and efficient magnetic can conveyor. But those considerations are just the tip of the iceberg.

Magnetic can conveyors have to run 24/7 during the canning season for years, even decades, at a time, so **reliability** is paramount. When canning season hits, the last thing you need is a down conveyor with product to move. Materials used to frame the conveyor, as well as all its components, should be durable and long-lasting. While the conveyor should be rugged, that doesn't mean routine preventive maintenance isn't necessary. Bearings are a component of every conveyor that require special attention. Bearings, as well as all of the conveyor's other parts, should be inspected and lubricated at regular intervals, usually on a weekly basis, and replaced — more on spare parts later in this article — on an as-needed basis to ensure the conveyor runs smoothly for years.

A magnetic can conveyor is a significant investment, both up front and through installation, maintenance, and operating costs, so it's important to consider **total cost of ownership**. Once a conveyor is designed, built, and paid for, it must be shipped to its final destination. End users must keep freight costs in mind when making the purchase. Installation costs must also be considered. If in-house resources are unable to complete the installation, contracted help should be hired. Contracted riggers will install the equipment, an electrician must



wire the system to code, and maintenance crews must ensure the installation is done properly, the machine runs perfectly through test runs, and maintain the equipment through its life cycle.

In addition, total cost of ownership encompasses a few other items to examine, including:

- the amount of power the conveyor will use and its annual cost
- the cost of labor it will require to operate the conveyor each year
- the cost of maintenance the machine will require annually

To meet food industry regulations and requirements, magnetic can conveyors need **unique features and specifications**.

Food manufacturing equipment, including conveyors, must go through **wash-downs** at regular intervals to keep the risk of bacterial and foreign-body contamination low. Food manufacturers go to great lengths to prevent food recalls and keep food products and consumers safe, and this encompasses the materials equipment is made from. A magnetic can conveyor for food manufacturing should be fabricated from 300-series stainless steel. This material doesn't rust and will completely eliminate the risk of oxidized or rusted metal contaminating food products.

The joints of the conveyors should be welded using continuous, food-grade welds. Bacteria are notorious for collecting in cracks and crevices of food manufacturing equipment. By using continuous, food-grade welds, along with non-porous 300-series stainless steel, daily wash-downs of the conveyor are easy and food residues harboring harmful bacteria are eliminated.

The side framing of the conveyors should also have openings for easy access of spray nozzles, soap, and

water during wash-downs. These openings not only provide easy access for wash-down equipment, they also expedite water drainage and drying so production can be resumed quickly.

A high-efficiency electric motor powers all magnetic can conveyors, and they can be divided into two categories: steel/aluminum motors and stainless steel-only motors compatible with wash-downs. Both are adequate for the food industry, but conveyors in plant areas with food contact surfaces should use motors compatible with wash-down requirements.

Finally, **safety features, such as guide or guard rails for conveyors**, should be considered, evaluated, and implemented when purchasing a magnetic can conveyor. Specifically, guide/guard rails and automatic shutoff are great features for avoiding catastrophes with elevated conveyors. If an elevated conveyor were to jam, cans would fall, causing a major safety risk for workers and the potential for thousands of dollars of wasted product. Guide/guard rails, coupled with automatic shutoff, can prevent this unlikely, but disastrous, scenario.

What To Look For In A Magnetic Can Conveyor Vendor

Having the right conveying equipment for food manufacturing is imperative, but equally important is purchasing the equipment from the right company. What should a can conveyor vendor-end user relationship look like?

Establishing a good, personal relationship will set the foundation for an enduring, long-term business relationship between the vendor and the end user. Vendors should be willing to make site visits to develop equipment quotes, address end user questions and concerns, and assist with planning, implementation, assembly, and first runs of equipment. This first-name rapport can be a distinguishing factor between a sale and a missed opportunity.

Equipment vendors will provide end users with installation and maintenance manuals. These manuals contain detailed instructions on installing and maintaining equipment to keep it running seamlessly for years. In addition, vendors should provide a baseline of training and instruction during installation so end users will be self-sufficient in operating and maintaining their conveyor.

All magnetic can conveyors have a serial number, normally located on the drive motor, accompanied by vendor name and phone number. In the event of an emergency breakdown, vendor help is only a phone call away. This can include over-the-phone support for diagnostics, problem-solving, and corrective actions, as well as scheduling maintenance and repairs via a vendor visit to the plant, if necessary.

In the event of a breakdown, spare parts purchased from the vendor should be kept on hand to resolve any issues by in-house crews. Buying original equipment

manufacturer (OEM) parts ensures the right part is purchased, it will fit the machine properly, and it will be covered if it malfunctions or becomes damaged prematurely. This simple aspect of buying only OEM spare parts can save many headaches in the long run. At a minimum, it's recommended to keep at least one of every part and one of every size belt for every conveyor in the plant. Additionally, a spare motor should be considered to avoid extended periods of downtime.

On the surface, magnetic can conveyors are a simple, yet effective and enduring, means to improving plant efficiency, safety, and bottom lines. However, conveyors are not a one-size-fits-all technology. Food manufacturers must take the time to evaluate their distinct needs and work with the right partner to find the exact customizable conveyor system for their unique operations.



About the Author

Donald Suderman is the Material Handling Product Manager for Bunting Magnetics Co. He works specifically in Technical Support for their Material Handling & Recycling equipment. Don has been with Bunting Magnetics for 37 years with most of that time being the Director of Technical Services and Engineering Manager over the design of Magnetic Conveying Equipment for all aspects of the Metal Stamping Industry.



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.