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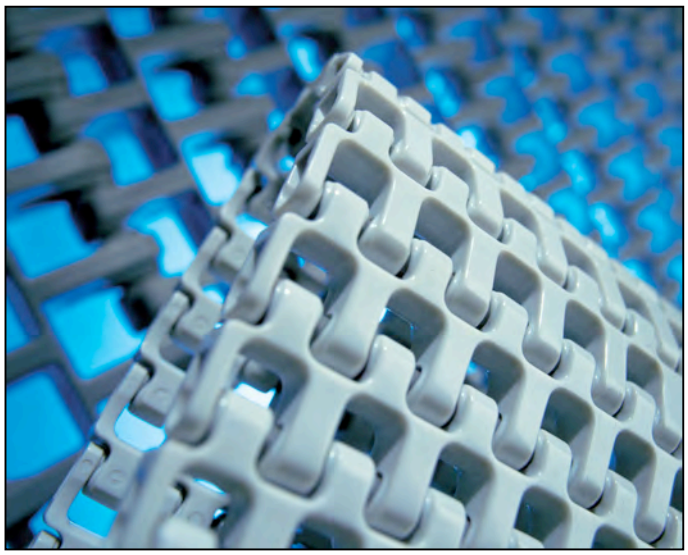
Tech Note

Technical Notes from the Technical Committee, NIBA – The Belting Association

#26 Introduction to Plastic Modular Belts



Since their introduction more than thirty years ago, the popularity of plastic modular belts has grown steadily. Constructed of injection-molded modules and hinge rods, plastic modular belts are positively driven and tracked by plastic sprockets. This positive drive and tracking system eliminates slippage, preventing damage to the belt's edge and the potential for product contamination or premature belt failure.

The injection-molded modules while produced in many different surface structures are primarily available in 3 different plastics; PP (polypropylene), PE (polyethylene) & POM (Acetal). Other plastics are available, but are not as common as the aforementioned types. Each plastic type has its own unique set of characteristics that affect the function of the conveyor belt. Some of these important traits include: hardness, temperature resistance, chemical resistance, strength, coefficient of friction and density.

Plastic Modular conveyor belts are assembled in a bricklayed pattern for strength and can be custom-made in virtually any width or length required. Various pitch sizes are also available to support specific conveyor designs--½ " pitch belts are used for tight transfers while larger pitch products such as 2" are used to convey heavier loads.

Modular belting is generally offered in either a closed or open hinge design. Once again the choice is determined by the application. The closed hinge types are designed for material handling and highly loaded non-food applications. The open hinge types are designed for applications where sanitation is critical. Special link designs are used which provide gaps between the links and thus allow access to the partially exposed hinge rod. Sanitation is greatly improved.

Many food manufacturers embrace the use of plastic modular belts for their sanitary benefits (e.g., non-porous thermoplastics, contoured easy to clean surfaces, partially exposed hinge rods, etc.), low maintenance and ease of repair. Industrial manufacturers also see the value that plastic modular belts add to the bottom line. These inherent benefits include higher strength, lower weight, lower product-to-belt fiction levels, as

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well as high resistance to abrasives and corrosives.

Plastic modular belts help increase plant efficiency and reduce manufacturing costs by minimizing plant downtime. The modular design of plastic modular belts greatly simplifies repairs since no specialized tools are required. Any damaged modules can easily be replaced by simply extracting the adjacent plastic rods without the need to remove the entire belt from the conveyor structure.

As noted earlier, plastic modular conveyors are equipped with plastic sprockets and shafts for drives. A common type is the square bore sprocket in combination with square shafts. These yield improved drive efficiencies by positively transmitting torque to the sprockets. The belt, in turn, is effectively driven because the individual sprocket teeth positively engage the underside of the belt--think sprocket and chain on a bicycle. These efficiency gains permit the use of lower-horsepower drive motors that result in energy savings for the plant.

Unlike flat belt systems that depend on high tension to transfer torque from the drive motor to the belt, sprocket-driven plastic modular belts are low-tension systems. This permits the design of less complex conveyor structures further helping a plant minimize production costs. Additionally, plastic modular belts' low-tension drive system results in decreased wear to bearings and ancillary components leading to longer conveyor component life and further savings in maintenance and replacement costs for the plant.

Plastic modular belts are used in a myriad of applications in the meat, poultry, seafood, bakery, confectionary, snack food, fruit and vegetable, beverage, brewery, container manufacturing, corrugated, newspaper, textile, and automotive industries. Benefits such as positive drive and tracking, ease of repair, reduced unscheduled downtimes, sanitation, high pull strengths, lower coefficients of friction, good chemical resistance, and excellent cooling and de-watering benefits have earned plastic modular belts a loyal following in these industries.

While there are many benefits to plastic modular belting, it is not the answer to all applications. Care must be taken when switching to modular on conveyors that were built for fabric belting. Modifications can be costly to make the conveyor modular friendly, and belt transition points may have to be altered due to larger diameter end roller requirements and the thicker modular belt. Belt speed and noise levels should also be considered as modular has some limitations.

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With the current state of the meat and poultry industry, cleanliness has become a major issue. Due to the hinges, modular is more difficult and time consuming to clean, and has the potential to harbor contaminants. Breakage is also a concern, as pieces of plastic can get into the food and not be detected until it gets to the customer.

Plastic modular is the new generation of belting, and while it has many benefits as pointed out, just be aware of the shortcomings as well.