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Technical Article

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Sanitation Aspects of Plastic Modular Belts

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Sanitation is a key issue in food processing, but the hygienic design of conveyor belts transporting food products is often overlooked. Staying current with changes in conveyor belts, applications and required design criteria can help to optimize belt selection for performance and sanitation.

Conveyor belts are an important part of the process and choosing the right belt is vital for the efficient and hygienic conditions of the production line. Conveyor belts are not cheap off-the-shelf items. There are many segments of industrial food processing; bakeries, candy, chocolate, meat, vegetable and ready meals, just to name a few. Within each segment, hundreds of applications that depend on conveyor belts can be found. A careful selection in the beginning may prevent future problems.

CONVEYOR BELT GROUPS

In food processing, there are three main belt groups (below):

1. coated fabric, monolithic or reinforced thermoplastic belts, **2.** plastic modular belts, and **3.** plastic conveyor chains. Depending on the intended use, each construction can provide advantages. This article will give a brief overview on sanitation aspects of plastic modular belts.

PLASTIC MODULAR BELTS

Plastic modular belts were first designed for the handling and processing of seafood. Because of the harsh abrasive nature of the application, other conveyor belt technologies would experience premature failure. The first plastic belts were made in 1971 and offered the advantages of ease of installation, tracking and repair, and outstanding cut, abrasion and chemical resistance. For these reasons, more than \$100 million of plastic belt is sold annually into food processing applications around the world.

Initial concerns with cleaning plastic belts have driven advances in product design, manufacturing technologies, raw materials, and accessories to produce more hygienic belts that provide longer life in cutting, boning, trimming, and other demanding applications. Conveyor designs that allow for easy access to the belt and easy removal of the belt also play an important role in overall sanitation.

COMPLEXITY OF INFLUENCE FACTORS

Performance of belts can be strongly influenced by the kind of food they are in contact with, by environmental factors, correct handling by the operators, and by cleaning procedures and cleaning agents.

THE VICIOUS CIRCLE

Conveyor belts are parts that wear with use. In many applications, surface abrasion, cuts, scratches or micro-



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cracks can appear over time. An increased frequency of cleaning or the use of aggressive detergents is likely to accelerate wear.

For surfaces in direct food contact this means increasing the risk of contamination and thus a serious hygiene problem. To break this vicious circle there are several innovative solutions that provide additional hurdles for microorganisms.

DESIGN FEATURES OF PLASTIC BELTS

To support hygiene, safety, and cleanability of plastic belts, there have been improvements in product design combined with the use of new materials. Some highlights are listed below:

- **Belt surfaces** – smooth, homogeneous, and nonporous surfaces that prevent food residues from sticking to belts, are easy to clean, and can inhibit growth of microorganisms. Belt surfaces vary among manufacturers depending upon quality and age of molds used for making the plastic modules.
- **New materials** – use of more chemically resistant plastics will slow belt surface deterioration from harsh chemical and mechanical cleaning influences. Incorporation of antimicrobial technology can provide an additional hurdle against growth of microorganisms on belt surfaces, especially in small cuts and micro-cracks that are difficult to clean.
- **Other designs feature (right)** – **1.** Oblong holes in the hinges of plastic modular belts make the pivot-rod more accessible so that food residues can be flushed out during cleaning. **2.** Dynamic gap ensures that the hinges open when running over the sprocket so that residues can easily fall out to be removed. **3.** Off-set hinges redirect cleaning solutions into the rod and hinge area.
- **Different colors** – Contrasting colored belts may be used to improve contrast to the conveyed food so that operators can easily detect pieces of a damaged belt mixed in with the food or can improve the operator's ability to determine the cleanliness of a belt.

COST ASPECTS

There is no “self cleaning” belt available and no conveyor belt will replace proper cleaning procedures. Well-designed conveyor belts on the other hand, selected according to the requirements of the application, can help to run lines more efficiently and also improve hygiene, improve product quality, and save money.

Reduction of cleaning time by installation of more hygienic plastic modular belt: A customer producing frozen fruit and vegetables reduced the cleaning time on one line by 35 to 40 percent. The use of plastic modular belts with optimized open hinge design minimized the gap between flights and conveyor frame which improved cleaning and reduced product damage.



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CLEANING CONVEYOR BELTS

Proper cleaning remains vital to the hygienic operation of conveyor belts. Several methods are used in practice: manual, semi-automatic and automatic cleaning (CIP- Clean-In-Place).

CONCLUSION

Designs of plastic modular belts will continue to evolve to meet the increasing sanitation demands of the food processing industry.