Flat-Flex® Conveyor Belting

Causes and Prevention of Black Residue Build-Up on Belting

Several causes of black residue build-up on Flat-Flex have been identified and we recommend the following approaches to either reduce and/or eliminate this residue.

Identified Causes

Wear

Black residue is the result of belt wear from the rubbing action between the belt joints, belt supports, sprockets, and other conveyor components. Major contributors to belt wear are excessive tension and/or speed. There should only be sufficient tension applied to keep the belt smoothly engaged on the drive sprockets.

Cleaning Products

Failure to thoroughly wash and clean belts after use can be a cause of black residue. Caustic cleaners can also leave a residue, which causes a blackening effect on the belt if not thoroughly rinsed off. Lab studies of many cases show virtually all components of black residue to be food ingredients, chlorine or other cleaning chemicals, and some stainless steel. Chlorine is corrosive to stainless steel, which may accelerate wear rate if not rinsed thoroughly.

Fats and Salts

When rubbed between metal surfaces, fats and salt from meat and poultry products can blacken and migrate along the belt strands.

Non-rotating Grooved End Rolls and Solid Nose Bars without Grooves

The high tensile strength stainless steel wire used in Flat-Flex belting is harder than most bar stock materials and will wear slots in the non-rotating groove end rolls and solid nose bars without grooves. This worn material will transfer to both the belt and product, as well as reduce belt life.

Poor Quality Wear Strips

Roughly finished wear strips are abrasive and will transfer black residue to the belt. Wire Belt Company recommends that all metal support strips be made from round stock. Roughly finished plastic support strips will 'hold' the black residue as it forms and becomes embedded in the porous or sawn plastic strips, thereby increasing belt wear by acting as an abrasive.

Friction

As noted previously, some of the black residue formed is from normal belt wear of type 302 stainless steel metal strands rubbing against each other. This is the most noticeable when the belt is new and 'breaking in', however, this is significantly reduced after a few days of operation.

Prevention of Black Residue

Reducing Belt Speed and/or Loading

Minimizing conveyor belt speeds reduces wear and interaction of food products with the belt as well as the conveyor components. In many instances, this solution can completely eliminate the problem because the slower the speed, the less tension needs to be applied to the belt.

Reducing Friction in the Belt Circuit

If stainless steel snub rolls, grooved end rolls, and tracking rolls must be used due to process requirements, all rolls should be made as large as possible and be able to rotate freely to reduce friction in the belt circuit.

Large diameter sprockets pull the belt more evenly with smoother hinging action, reducing rubbing of the belt mesh at its hinge points and the sprocket teeth, thus reducing the friction wear.

Improve Natural Lubrication of Conveyor Components

When the processes are dry, such as conveying frozen or baked products, and natural lubrication of the conveyor components from the product or process is minimal, Wire Belt Company recommends plastic drive sprockets, end rolls, and belt support strips. Both Delrin® (or equivalent), or UHMW polyethylene plastics provide smooth and relatively strong alternatives to steel components and are reliable from 0° to 179.6°F. Round or oval extruded UHMW support strips are most suited to keep blackening to a minimum.

In many processes, the belt is subjected to natural lubrication from cooking oil, the product itself, or other process coatings. This form of lubrication helps reduce friction from occurring on the belt, wear strips, and drive components to a point that any blackening problem is eliminated or unobjectionable.

Creating Awareness of Rinsing Requirements

Sanitation crews should be made aware that all belts, sprockets, end rolls, nose bars and support strips must be thoroughly rinsed of all product residue and cleaning products.

Continuous Cleaning Systems

Many conveyor systems use clean-in-place, wash and brush systems to continuously keep the belt free of any type of product or residue build-up on the belt.

Correct Belt Selection

Flat-Flex belts are available in a variety of mesh sizes and wire diameters. Selection of the correct mesh and wire size is important with respect to the application's belt speed, length of the conveyor, size, weight and distribution of the load. Always select the largest mesh size and wire diameter available consistent with the application. Wire Belt Company's Technical Sales department will provide help in belt and sprocket selection. With proper belt selection, a sound conveyor design and careful maintenance, a conveying system can be assured to be virtually free of an accumulation of black residue attributed to the belt.

Other Notes

Technical Support

If you require further information regarding black residue or metal belting in general, please call Technical Sales on 603-644-2500 or e-mail support@wirebelt.com.

Wire Belt Company offers personal field and technical assistance to all Flat-Flex wire belt users.

A Note about Flat-Flex Belts

Flat-Flex belts are made of the finest quality, high tensile strength, highly polished type 302 stainless steel. To date, Wire Belt Company has found no better material which balances belt life, formability, blackening, and cost than type 302 stainless steel.

The belt's open construction and unique hinging design provides for the most easily cleaned open mesh available. Since 1973 the US Department of Agriculture fully accepted Flat-Flex for use in federally inspected meat and poultry plants.

For over 60 years, Flat-flex has been successfully used in food plants around the world.