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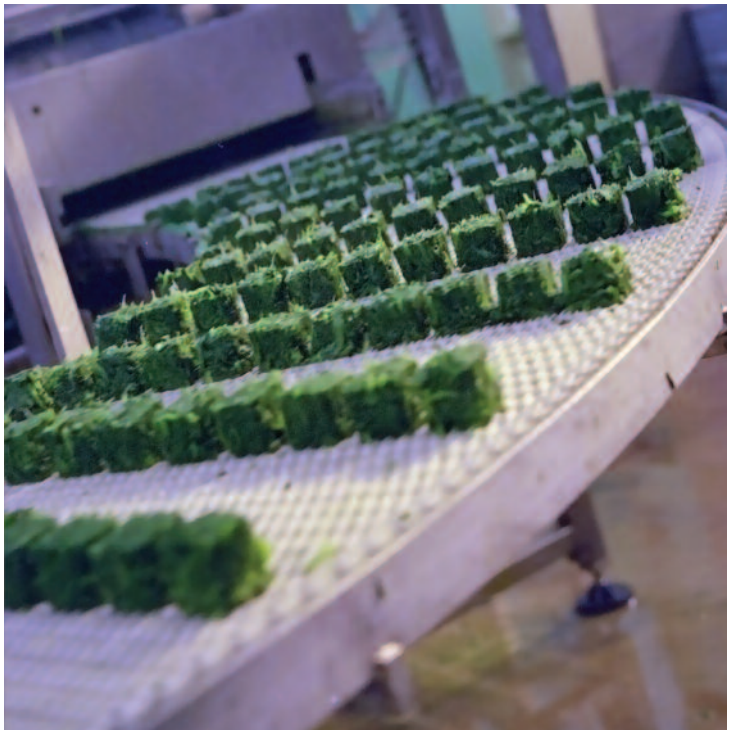
HIGH PERFORMANCE PEEK POLYMERS

VICTREX® PEEK Polymer For High Performance Belting

Victrex Polymer Solutions, a division of Victrex plc, is a leading global manufacturer of high performance polymers, including VICTREX® PEEK polymer, APTIV™ film and VICOTE® Coatings. These materials are used in demanding applications over a broad range of markets and offer an exceptional combination of properties that help processors and end-users reach new levels of cost savings, quality and performance.

Conveying systems are used in food and beverage processing, textile manufacturing and a multitude of other industry sectors to process large quantities of product efficiently. Conveyor belting and belting components must be durable, easy to maintain and clean. They must also be able to withstand harsh chemical cleaning agents as well as high pressure steam cleaning and sterilization without effect on mechanical performance. VICTREX PEEK polymer's unique combination of properties meets these challenges head on enabling the design and production of long life belts and belting components. Available in a variety of product formats which include resin, coating, film and fiber, VICTREX PEEK polymer offers design engineers unparalleled design flexibility along with 30 years of application development expertise.



VICTREX PEEK POLYMER BELTING FORMATS

- VICOTE coated belts
- Molded belts and belting components
- APTIV film belts
- Woven PEEK fiber belts

TYPICAL BELTING REQUIREMENTS

- High temperature performance
- Durability
- Abrasion resistance
- Chemical resistance
- High stiffness-to-weight ratio
- Steam resistance
- Dimensional stability
- Non-stick properties
- FDA compliance
- Easy to clean

BELTING APPLICATIONS

- Oven belts
- Fryer belts
- Transport belts
- Food processing drying belts
- Paper machine drying belts
- Textile carrier belts
- Suction belts
- Bearings, bushings, rollers
- Wear strips, slide plates, chains

For Enhanced Food and Industrial Conveyor Belt Performance

OVERCOMING THE LIMITATIONS OF TRADITIONAL MATERIALS

Materials used in belting need to provide numerous performance properties to satisfy the varying requirements of industries in which they are used. Regardless of format, VICTREX PEEK polymer offers a high performance solution that overcomes the limitations of traditional materials. VICTREX PEEK polymer's unique combination of properties makes it an ideal choice for the most demanding applications.

Food Processing

As line speeds and temperatures increase and cleaning protocols become more aggressive, high temperature, chemical, abrasion, and corrosion resistance along with ease of cleaning have all become critical requirements in today's demanding food processing applications. Traditional materials such as PTFE and silicone coated glass woven fabrics, and coated stainless steel struggle to meet all of these new demands. VICTREX PEEK polymer's unique combination of properties is filling that void delivering solutions that improve performance, reliability and productivity.

CASE STUDY

VICTREX PEEK POLYMER FIBERS INCREASE EFFICIENCY OF BELTS

Sefar Inc. has developed a range of conveyor belts for the pasta industry made from a VICTREX PEEK monofilament fabric. Standard belting fabric, like PET, has a short lifetime in humid and saline working environments, and PVdF has poor dimensional stability. VICTREX PEEK monofilament supplied by ZYEX Ltd. offers a unique solution to overcome these deficiencies, enabling the drying process to be pushed harder, increasing endurance, and reducing overall capital costs.

During the manufacture of purified terephthalic acid (PTA), belts operate at 140°C (284°F), in acidic conditions under high loads and flex. VICTREX PEEK polymer is the only material that can withstand these complex stresses. Since it is very difficult and time consuming to replace the belts within the closed production environment, the VICTREX PEEK monofilament fabric allows much longer periods between belt changes than conventional fluoropolymer-based fabrics.

Textile Industry

The demands that the textile industry places on carrier belts continue to increase. The belts must have a temperature resistance of up to 260°C (500°F) coupled with excellent release properties. They often need to be semi-conductive, yet be chemically inert and easy to clean. Many of materials used for fuse pressing weaken when used for transportation at high temperatures levels. They struggle to withstand the heat and steam used in many ironing processes, and show their limitations to chemical contact and hot-air circulation. VICTREX PEEK polymer's unique combination of properties has improved belt life and performance when used in this demanding environment.

KEY FEATURES OF VICTREX PEEK POLYMER

- High temperature performance, continuous use temperature of 260°C (500°F)
- Outstanding wear resistance over wide ranges of pressure, velocity, temperature and counterfacial roughness
- Excellent chemical resistance to a wide range of chemical environments, even at elevated temperatures
- Good flammability performance without the use of flame retardants, and the inherent purity of the material results in extremely low smoke and toxic gas emission in fire situations
- Hydrolysis resistance, retain mechanical properties when exposed to elevated temperatures in steam or high water pressure environments for extended period of time
- High strength-to-weight ratio, exceptionally high strength properties combined with good toughness over a wide range of temperatures
- Inherent purity, exceptionally low levels of ionic extractables and excellent outgassing characteristics

VICOTE COATINGS

Belting systems coated with VICOTE Coatings, based on VICTREX PEEK polymer, offer increased wear and abrasion resistance, improved cut-through resistance, and increased puncture and impact resistance. Case studies show that coating with VICOTE Coatings can increase a belt's life by up to 40%, reducing both downtime and maintenance costs for the belt manufacturer's customers.

KEY FEATURES OF VICOTE COATINGS

- High heat resistance — to 260°C (500°F)
- Superior scratch resistance
- Excellent mechanical properties – including creep and cut-through resistance. Extremely durable at high temperatures. Exceeds that of all Fluoropolymers.
- Exceptional wear and abrasion resistance
- Broad chemical resistance
- Good release
- No rub-off
- Improved anti-static properties
- Superior dimensional stability
- Eco-friendly – majority of dispersion grades are aqueous (water) based and are formulated to contain some of the industry's lowest levels of volatile organic compounds (VOCs).
- FDA, RoHS compliant

APPLICATIONS

It is the unique combination of properties offered by VICOTE Coatings, made with VICTREX PEEK Polymer that led Taconic International, a pioneer in the manufacture of PTFE-coated fabrics and other high-temperature/non-stick materials, to incorporate VICOTE Coating dispersions into its leading-edge coating systems for glass fabric belts, the TACMASTER and TACFUSE product ranges.

TACMASTER FOOD CONVEYOR BELTS

Typical woven, glass fiber-coated conveyor belts used in high wear, abrasive and high temperature environments in contact with hot cooking oil and grease, have a short service life — some belts need changing up to 60 times a week.

By adding VICOTE Coating dispersions to its special PTFE formulation, Taconic has been able to increase belt life by up to 40%, reducing downtime and maintenance costs for its customers through:

- Increased abrasion resistance
- Increased wear
- Improved cut-through resistance
- Non-stick properties
- Increased puncture resistance

CASE STUDY

VICTREX PEEK POLYMER A NATURAL FIT FOR FOOD PROCESSING CONVEYOR BELT CHAIN APPLICATIONS

Tokyo-based Yamakyu Chain Company selected VICTREX PEEK polymer for use in conveyor belt chains for high-speed beverage and food processing lines. High heat resistance and superior chemical resistance are essential requirements in the food processing industry. Based on the performance properties slat band chains made of VICTREX PEEK polymer are proving an ideal fit.

Traditionally, this industry has used intermesh, low friction transfer plates made from acetal. But acetal's operating temperature limit of 80°C (176°F) prohibits its use in high-temperature environments. Chains made with VICTREX PEEK polymer can withstand exposure to temperatures as high as 250°C (482°F). In addition, they offer superior long-term resistance against detergents such as chlorine and hydrogen peroxide as well as antistatic properties.

Stainless steel has typically been the material of choice for chains requiring high heat resistance. However, stainless steel chains need lubrication to ensure smooth operation and this creates adhesion problems and product contamination. An added benefit, VICTREX PEEK polymer is naturally lubricious and the chains can run at a rate of 200 m/min (11 ft/sec) without lubrication. In addition, the chains are a third of the weight of stainless steel chains allowing for motor downsizing that saves power and reduces operating noise.

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TACFUSE FUSE PRESS BELTS

Glass fiber-coated fuse press belts for the fuse press and flat bed lamination industries require a certain rigidity or stiff construction.

By incorporating VICOTE Coating dispersions into its proprietary PTFE-formulation, Taconic has been able to increase belt life (up to 40%) and minimize downtime. Easier to clean and maintain, TACFUSE belts eliminate PTFE migration and the result is an improved finished product with:

- Increased scratch resistance (up to 38%)
- Increased wear and abrasion resistance (up to 20%)
- Improved anti-static properties
- No rub-off
- Increased adhesion of PTFE to glass
- Greater dimensional stability

APTIV FILM

APTIV film is being used to replace belts made of woven fiber glass coated with PTFE. Over time, contaminants such as grease and food cause the PTFE layer to release from the fiber glass. The PTFE layer "flakes" off, causing the belt to lose release properties, shortening the lifecycle and creating the food contamination. Additionally, APTIV film provides better resistance to puncture than the PTFE/glass belts. During processing it is not uncommon for bones and sharp components to poke through the soft PTFE layer and separate it from the fiber glass.

APTIV film is the most versatile and high performing thermoplastic film available. Its unique combination of properties provides an unrivaled material solution significantly increasing the lifespan of food grade conveyor belts. APTIV film is produced from VICTREX PEEK polymer and provides all of the properties of VICTREX PEEK polymer in a flexible format.

KEY FEATURES OF APTIV FILM

It is uniquely positioned to meet the critical requirements of the food processing industry:

- FDA food contact and dairy 3A certified — APTIV film grades may be safety used for repeated food contact.
- High heat resistance — can withstand oven temperatures for "protein-based" products.
- Excellent wear properties — inherently lubricious, very smooth surface finish and low particulation.
- Excellent barrier properties — provides an effective barrier against many liquids.
- Broad chemical resistance — insoluble in all common solvents.
- Lightweight, halogen free.

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