



Kuraray Case Study

SEPTON™ BIO-series
—
The sustainable TPE's
for footwear



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The sustainable TPE's for footwear

Sector

Manufacturers of shoes and sports articles

Application

Sustainable shoes with maximum grip and enhanced comfort

The challenge:

Shoes should be comfortable, attractive and stylish, and also have optimum grip in wet and icy conditions. Until now, petrochemical-based elastomers have been essential to meet such requirements. However, consumers are increasingly looking for more sustainable products.

The solution:

The SEPTON™ BIO-series is a new range of sustainable TPE materials from Kuraray that significantly increases the ecological profile of shoes.

- The SEPTON™ BIO-series is produced from beta-farnesene made from sugar cane and contains up to 80 percent natural renewable raw materials
- These TPE materials are compatible with bio-based PP, PE and oil – to maximize the organic content of products
- The SEPTON™ BIO-series is versatile: it can be used in soles, foam cushioning and synthetic leather uppers

Customer benefits:

The SEPTON™ BIO-series helps manufacturers improve the sustainability, performance and comfort of footwear.

- It makes shoe soles extremely soft and ensures optimum grip on dry, wet and icy surfaces
- As an elastic foam, the SEPTON™ BIO-series provides excellent vibration damping to maximize comfort at every step
- The unique viscosity of these products enhances the efficiency of manufacturing processes such as injection moulding. Good flow properties enable manufacturers to optimize production processes, resulting in lasting energy savings



SEPTON™ BIO-series

Sustainable TPEs for comfortable shoes with outstanding grip

The new SEPTON™ BIO-series TPE materials improve the performance and comfort of shoes as well as giving them an optimum ecological profile

Background and requirements

Sustainability becomes an emerging importance when buying shoes

Modern shoes must be comfortable and have a good grip on a variety of surfaces. At the same time, people expect them to look good. Until now, petrochemical-based thermoplastic elastomers (TPE) have been essential for that: they give soles a good grip, while their elasticity optimizes vibration damping and low friction means shoes do not wear out so fast. At the same time, more and more consumers want products that are envi-

ronmentally friendly. In a survey by the Statista market research organization, 80 percent of respondents said that sustainability influences their decisions to buy clothing. Kuraray's SEPTON™ BIO-series of bio-based copolymers offers footwear manufacturers a sustainable, high-performance alternative that is superior to conventional TPEs in many ways.

The solution

Maximize the percentage of organic products in shoes – with elastomers produced from sugar

The SEPTON™ BIO-series is made from beta-farnesene, a synthetic material produced from a renewable raw material (sugar cane).

Special strains of yeast are used to produce this renewable monomer. During fermentation, these micro-organisms convert sugar sources such as sugar cane into beta-farnesene, which is then polymerized to produce the SEPTON™ BIO-series with its unique structure of hydrogenated styrene farnesene block copolymers (HSFC).

„The materials in our SEPTON™ BIO-series are produced using up to 80 percent renewable raw materials and are compatible with many renewable oils and plastics such as bio propylene and polyethylene. That enables manufacturers to significantly increase the organic component of shoes.“

*Jan-Sebastian Weber,
Senior Sales Manager*



*Sugar for a perfect grip:
The bio-TPEs in Kuraray's SEPTON™ BIO-series are produced sustainably from beta-farnesene based on sugar cane. Their unique properties make them far superior to many conventional TPEs – for products with better performance and a very good environmental profile. The SEPTON™ BIO-series gives shoe soles very good grip even in wet and icy conditions.*



The concept

Renewables in all components – from the sole to the leather

The SEPTON™ BIO-series offers benefits for many components of shoes thanks to its outstanding properties, which include high elasticity and vibration damping. When used as starting products for shoe soles, these copolymers give very good grip. Their wet grip and performance over a wide temperature range are far superior to conventional TPEs. In addition, products from the SEPTON™ BIO-series can be foamed, so they can be used to produce very flexible, vibration-damping layers. These retain their shape even when exposed to constant pressure – for long-lasting wear comfort. And thanks to their unique elasticity, synthetic leather containing products from the SEPTON™ BIO-series is ideal for robust and durable uppers.

Customer benefits

Optimal sustainability profile, improved quality

“With the SEPTON™ BIO-series, we enable the footwear and sports industry to develop sustainable shoes that meet consumers’ demands for environmentally friendly and resource-efficient products,” says Marcel Gruendken, Manager MD&TS. “At the same time, our SEPTON™ BIO-series enables manufacturers to improve the quality and properties of their products. Since they are far less rigid than conventional HSBC polymers, far less plasticizer is required when processing the SEPTON™ BIO-series. Oils do not bleed to the surface and the shoes keep their elasticity. Another benefit for shoe manufacturers: the very low viscosity of the products in the SEPTON™ BIO-series makes them an excellent choice for processes such as injection moulding. And since processing is very simple, they cut production times and make manufacturing processes more efficient.



*An optimized (sustainability-) profile:
The bio TPEs in the SEPTON™ BIO-series from Kuraray comprise up to 80 percent renewable raw materials. Their unique properties make them suitable for many different components of shoes – from soles to durable and elastic manmade leather for uppers. And that facilitates the production of shoes with a much higher bio-content compared to conventional used raw materials.*

The shoes are prototype made by Kuraray Co. Ltd.

About Kuraray

Established in 1991, Kuraray Europe GmbH is based in Hattersheim, near Frankfurt am Main, Germany. In 2019 the company generated annual sales of EUR 661 million.

It has more than 700 employees in Germany at its sites in Hattersheim, Frankfurt and Troisdorf. Kuraray is a global speciality chemicals company and one of the largest suppliers of industrial polymers and synthetic microfibres for many sectors of industry.

Examples are KURARAY POVAL™, Mowital®, Trosifol® and CLEARFIL™. Kuraray Europe also has around 200 employees at six other European sites. They are also working on the development and application of innovative high-performance materials for a wide range of sectors, including the automotive, paper, glass and packaging industries, as well as for architects and dentists.

Kuraray Europe is a wholly owned subsidiary of the publicly listed Kuraray Co., Ltd., which is based in Tokyo, Japan, and has more than 11,100 employees worldwide and sales of EUR 4,7 billion.

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