

With high energy through the working day

Novel cushioning system made of VESTAMID® soft foam for safety shoes



CONTACT

Dr. Ursula Keil

Head of Market Communications
High Performance Polymers
Phone +49 2365 49-9878
ursula.keil@evonik.com

Klaus Huelsmann

Director Sports
High Performance Polymers
Phone +49 2365 49-5258
klaus.huelsmann@evonik.com

Evonik Industries AG

Rellinghauser Straße 1-11
45128 Essen
Germany
Phone +49 201 177-2223
www.evonik.com



Safe, comfortable, and stylish.

This is how BIG Arbeitsschutz GmbH believes footwear for the workplace should be. BIG is a specialist in the manufacture of safety shoes. Safety shoes equal

to athletic shoes for a competition, designed with the same care and attention to detail. The activeBumper cushioning system developed using VESTAMID® PEBA has raised the bar setting a new standard for safety shoes.

Safety shoes are usually worn all day and every day. A common aspect of the safety shoe across models is the toe cap – that protective area at the front of a shoe made from metal or plastic to protect the toes. Usually, safety shoes are made using decades-old technology, which gives that recognizable clunky look. Even worse, they are often heavy and not particularly comfortable. This was the focus for BIG, a company founded in 1983. "We wanted to bring innovation to the safety shoe market", says product developer Lothar Merk. "Shouldn't shoes that protect us at work also provide optimum support for our feet and be comfortable?" he adds to explain BIG's fundamental aim. His colleague Magnus Kirschstein, Head of Marketing, adds, "and beyond function, shouldn't these shoes also be fashionable and reflect the individual style of the wearer?" For safety shoes, this combination is not easy, and Merk, Kirschstein, and their colleagues are always on the lookout for the latest technologies and design ideas that they can integrate into RUNNEX® safety shoes – BIG's brand name.



THE SEARCH FOR THE RIGHT PARTNER

Merk stumbled across a promising new technology in early 2020. He wanted to use a lightweight, cushioning foam in the latest line of safety footwear to protect workers from daily wear and tear on their joints as much as athletes. "Look at the factories! Workers need to walk miles, stand all day, climb scaffolding, and, and, and. They are athletes that perform at peak-level every day. But this performance isn't done in sport shoes, they wear heavy safety shoes", he explains. "Shoes with cushioning foams provide an additional function. They provide support and comfort to the wearer by returning the impact energy normally absorbed by the shoe back to the wearer."

Merk, a passionate recreational athlete, found what he was looking for while reading a magazine for runners. The magazine had published an overview of companies that produce materials for soles in sports shoes. Evonik was among them. The specialty chemicals company has been developing plastics for athletic shoes for about 50 years, always in close cooperation with customers and in tune with the latest trends and requirements of the sports industry. Without any prior knowledge of Evonik or having any contacts, Merk had to take a rather simple approach: "I sent an email to info@evonik.com and that's how this partnership started!"

THE MATERIAL IS DECISIVE

The product Merk was interested in comes from the VESTAMID® PEBA family. Polyether block amides were introduced to the market by Evonik more than 40 years ago. From the beginning, they were characterized by excellent elasticity and good recovery

behavior. These are properties that leading sporting goods manufacturers value in sports shoes. They use them to manufacture midsoles, ski boot sleeves, heel parts, in other words, compact shoe components. But now Evonik has equipped some types of material so that they can be foamed. A processor uses them to produce foam sheets of varying thickness and elasticity. The finished foam is light, durable, and resilient: Its rebound behavior far exceeds the other soft foams previously used in shoes and it returns most of the absorbed energy back to the wearer. What's more, its low weight ensures maximum comfort for the wearer. That was exactly the performance profile Merk was looking for. Kathrin Salwiczek is responsible for the material for flexible foams in the sports and leisure market at Evonik's High Performance Polymers Business Unit and when she received the inquiry, she immediately wanted to get started. "Our experience is based in using flexible foams made from VESTAMID® PEBA in sports shoes through our joint developments with customers. Adapting it for safety footwear was an exciting project. We were even able to exceed BIG's expectations for rebound resilience", Salwiczek explains. "In the world of sports, our material is very well known, but with RUNNEX® safety shoes, VESTAMID® PEBA is penetrating a new market." Salwiczek sees the fact that BIG has recognized the potential of PEBA foam as an opportunity for Evonik to make VESTAMID® known as a high-performance plastic for everyday footwear.



STYLE AND PERFORMANCE IN ONE

The high performance of the plastic is due to the polyether segments in the polymer chain, which provide the high elasticity and good resilience. "In sports, it's all about being the best. Setting a record one day and re-starting training the very next day to break it again. It's the same at Evonik. We are constantly working on finding the next solution, creating materials to make the previously impossible possible", says Salwiczek. The new PEBA foam is proof of this. The activeBumper made from this foam provides a cushioning layer that remains elastic over lifespan of the safety shoe with no signs of material fatigue. The rebound effect, i.e. the rebound elasticity of the foam is 73 percent. That is significantly higher than comparable products and ensures fatigue-free and joint-friendly work all while increasing comfort. Another property of PEBA foam is its low weight. It is up to 50 percent lighter than comparable expanded thermoplastic polyurethane (ETPU) foams. High resilience combined with the lower weight make every step noticeably easier.

When RUNNEX® came onto the market, the company wanted to offer not only safety and comfort, but also fashion and personal style. Creativity should also be expressed in the workwear. Magnus Kirschstein remarks: "At RUNNEX® we focus on fashionable details as shape, color, and pattern, so that everyone can choose the shoe according to their preferences."

SUCCESS AS A TEAM

Developing new technologies and creating innovative safety shoes is not easy. Products need to be tested and adapted to ensure they advance to the next level. "You need the right partner to integrate new technology into safety shoes. With Evonik, we have the right partner", says Merk. "Kathrin Salwiczek and her colleagues have the expertise to adapt the properties of the foam and we know what is required for a high performing safety shoe." As an avid runner, Merk knows what benefits technological advances could bring to the next generation of safety shoes. But only a team working hand in hand could consider and implement all the aspects necessary for this. After just over a year of working together, Evonik has become an integral part of the RUNNEX® team. "We really didn't expect it to be like this. Evonik is a large international chemical company but has supported us every step of the way. We entered the arena together and delivered an outstanding performance", Merk concludes.

Learn more here:

<https://sports.evonik.com/en/elasticity/footwear/flexible-foams>

<https://activebumper.de/>

Company information

Evonik is one of the world leaders in specialty chemicals. The company is active in more than 100 countries around the world and generated sales of €12.2 billion and an operating profit (adjusted EBITDA) of €1.91 billion in 2020. Evonik goes far beyond chemistry to create innovative, profitable and sustainable solutions for customers. About 33,000 employees work together for a common purpose: We want to improve life today and tomorrow.

About Smart Materials

The Smart Materials division includes businesses with innovative materials that enable resource-saving solutions and replace conventional materials. They are the smart answer to the major challenges of our time: environment, energy efficiency, urbanization, mobility and health. The Smart Materials division generated sales of around €3.4 billion in 2020 with about 7,900 employees.

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