



# Revolutionary Foam Material for Footwear Midsoles



Better performance for users and increased manufacturing automation for producers

The vast majority of athletic shoes are made up of three (3) main components: an upper section, which is typically made of fabric or leather and secures the shoe to the foot; a soft midsole; and an outsole that contacts the ground during use.

Of these three key components the midsole is arguably the most important part of the shoe as it is responsible for cushioning and stability for the user. The overwhelming majority of athletic footwear midsoles today are made from ethylene vinyl acetate (EVA), a material that degrades quickly in performance (cushioning and durability) and requires labor-intensive preparation. In addition to being lightweight, EVAs offer softness, flexibility, and number of other desirable characteristics such as resistance to water and stress-cracking. However, they do not perform as well with regards to long-term durability and compression. Over time, as EVA midsoles lose some of their elastomeric properties, their ability to absorb impact from the ground decreases. And when this occurs, the energy from the impact of the stride is transferred into the foot, ankle, and leg of the runner.

Recognizing a critical need for a high-



quality midsole material that benefits both users and manufacturers, Lubrizol Engineered Polymers formulated a unique material made from thermoplastic polyurethane (TPU) chemistry and the MuCell® Injection Molding Technology to form Bouncell-X™ – a low density, plasticizer-free, recyclable\*, thermoplastic



foam that outperforms EVA in terms of cushioning, compression, and durability, and helps athletic footwear manufacturers significantly improve overall production efficiency.

Although EVA has been the material of choice for shoe manufacturers over the past few decades, its cross-linked molecular structure makes it unrecyclable and poses problems for footwear companies that are looking to increase the sustainability and environmental friendliness of their operations.

Bouncell-X™ microcellular foam, using Trexel's MuCell® physical foam injection molding technology, generates a highly uniform cell structure that provides more than an 80% reduction in density when compared to conventionally molded TPU. Additionally, Bouncell-X technology, utilizing nitrogen gas as blowing agent, contains no extra chemical additives, making it a good fit for brands with post-consumer recycling\* programs.

With increasing demands for better performance, higher production efficiency, and improved sustainability, footwear producers today are facing challenges that require innovative solutions.

Combining the unique benefits of TPU chemistry with the efficiencies of foam injection molding, Bouncell-X™ allows shoe manufacturers to improve the quality, toughness, and environmentally friendliness of their products.

## 5 KEY PERFORMANCE ATTRIBUTES

- Quality
- Durability
- Cushioning
- Lightweight
- Low Compression Set

## 5 KEY MANUFACTURING ADVANTAGES

- Waste Reduction
- Improved Quality
- Increased Automation
- Enhanced Environmental Friendliness
- Better Aesthetics

### Company Overview

The Lubrizol Corporation, a Berkshire Hathaway company, is a technology-driven global company that owns and operates manufacturing facilities in 17 countries, as well as sales and technical offices around the world. Founded in 1928, Lubrizol has approximately 9,000 employees worldwide.

### Lubrizol Engineered Polymers

A division of The Lubrizol Corporation, Lubrizol Engineered Polymers combines over 55 years of experience with a worldwide network that includes formulation design, manufacturing, R&D and cutting-edge technologies to become a trusted partner to our customers. Our broad portfolio of engineered polymer solutions includes expertly formulated resins that can cross many industries, with applications in the industrial, electronics, and sports and recreation industries.

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