ExxonMobil
Signature Polymers

Case Study

Exceed™ Stiff+

Qian Heng relies on Exceed™ Stiff+ metallocene polyethylene to assist in the development of a shoe sole foaming solution, providing performance with reduced compound material usage for a lightweight design vs. current solution

- Excellent mechanical performance
- Simple, smooth foam processing
- Uniform foam structure
- Excellent rebounding performance

Data and results presented herein apply specifically to the noted application under this case study.
Your results may differ depending on factors such as operating conditions, equipment and materials used.

Challenge

Produce an ethylene vinyl acetate (EVA)-based lightweight shoe sole uisng less material than the current solution while maintaining good mechanical performance

Qian Heng, a leading shoe sole compounder based in Fujian Province, China, wanted to develop a new EVA-based shoe sole solution with higher foaming ratio than its current solution of EVA blend foam with polyolefin elastomer (POE) and polyethylene (PE). This can help their customers produce lightweight products using less material.

Currently, many shoe soles are made using EVA and POE foam for excellent shock absorption properties that can effectively cushion the foot and help protect it from impact. However, these solutions can lead to inferior mechanical properties. One potential method to retain mechanical properties is to add PE. Qian Heng found that the mechanical properties produced from its EVA/POE/PE blend were still not sufficient when they want the foam to significantly expand.

As a result of a long history of collaboration (working together since 2016), Qian Heng turned to the polymer and application experts from ExxonMobil's polyethylene business for advice.

Solution

Exceed™ Stiff+ m 0820 metallocene polyethylene improves durability and resilience compared to the current solution, while providing simple and smooth foam processing for a uniform foam structure

ExxonMobil recommended that Qian Heng incorporate Exceed Stiff+ metallocene polyethylene resins in its EVA formulations to help improve resilience and processability. As a result of collaborating with ExxonMobil, Qian Heng developed an innovative, high-performance solution for lightweight EVA shoe soles that met customer specifications.

Mr. Xu Chaoqun, Plant Manager at Xiamen Qian Heng Industry Co. Ltd., highlighted the importance of lightweight innovation in driving growth in the shoe sole market. "By utilizing Exceed Stiff+ m 0820 metallocene PE, we have achieved enhanced thermal stability and resilience when compared to traditional EVA/POE/PE blend. Additionally, our use of Exceed Stiff+ metallocene polymers has allowed us to develop a cost-effective solution with a higher foaming ratio, reducing the amount of material required."

谦衡 QIANHENG

Results

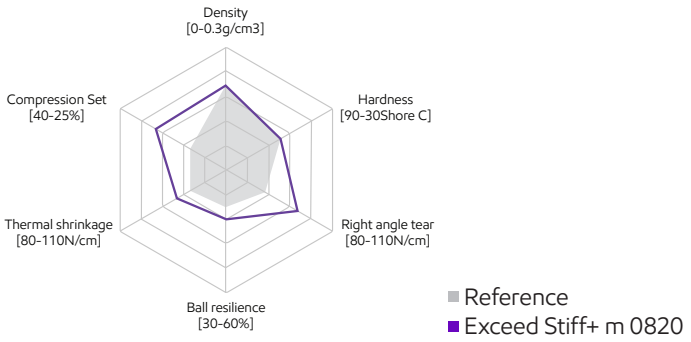
Created lightweight shoe soles that utilize less material while upholding strong mechanical performance

Xiamen Qian Heng Industry Co. Ltd. carried out tests which demonstrated that the utilization of Exceed™ Stiff+ m 0820 metallocene PE in the formulation, at a regular foaming ratio, resulted in superior overall performance compared to its current formulation. Noteworthy enhancements were observed in performance aspects such as thermal shrinkage and right angle tear.

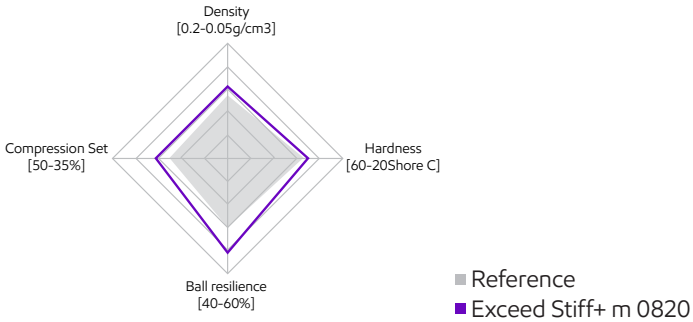
Furthermore, when the foaming ratio was increased, Exceed Stiff+ exhibited improved compression set and ball resilience. This advancement allows Qian Heng to create lightweight shoe soles that utilize less material while upholding strong mechanical performance.

"Exceed Stiff+ metallocene PE provides us an effective solution for producing lightweight soles that meet the demands of today. We are very excited about the new growth opportunities this solution is creating for our business." said Xu.

Performance at regular foaming ratio



Performance at higher foaming ratio



Test item	Test method
Ball resilience	DIN53512
Compression set	SATRA™ 64
Right angle tear	ExxonMobil method
Surface hardness	SATRA™ 205
Thermal shrinkage	SATRA™ 70
Density	SATRA™ 138

Data from tests performed by or on behalf of ExxonMobil

Contact us for more information: **exxonmobilchemical.com/pe**

ExxonMobil Signature Polymers

Bring your impossible

What's new: ExxonMobil Signature Polymers

All our polymers are now positioned under a single portfolio brand: Signature Polymers. The aim is to simplify our product architecture and naming to improve portfolio navigation for you. We would like to stress that our commitment to high quality products remains the same, it is the names that change. Everything else remains the same. We will be making these modifications over the next six months so you will see both old and new grade names highlighted during that time.

Here's a quick overview of brands and grade names that have changed in this document:

Legacy Commercial Name	New Commercial Name
Exceed™ S 9272	Exceed™ Stiff+ m 0820

Some of our existing Exceed, Achieve, Paxon and premium PP/HD grades have moved to Exceed brand; most existing Enable grades have moved to Exceed Flow[+]; most of our existing Exceed XP grades have moved to Exceed Tough[+]; most of our existing Exceed S grades have moved to Exceed Stiff[+]. More details here **https://www.exxonmobilchemical.com/en/brands/signature-polymers/exceed_high_performance_polymers** or contact your ExxonMobil representative to know more.

Want to see what's changed in our portfolio? Go to exxonmobilchemical.com/sptransform