

## SABIC foam innovations addressing global challenges

The growth in the world's population is posing increasing challenges along the food supply chain, on precious resources, housing and on transportation. Among these challenges, two principal needs can be distinguished: those for improvements in sustainability and in efficiency.

SABIC regards polymer foam technologies as essential to meet these improvement needs: on the one hand they offer material and energy savings while retaining or even improving product performance, and on the other hand they offer unique benefits over non-foamed polymer technologies, such as thermal and acoustic insulation, cushioning and protection. Enhanced physical properties and improved foamability of the polymers themselves provide the key to enabling more efficient material usage and energy saving with foam technologies.

### **A large, diverse and growing industry**

The polymer foam-producing industry currently consumes around 25 million metric tonnes of plastics every year, creating revenues of around \$83 billion. It is expected to grow by close to 2.5% per year over the next ten years. Polymer foams are widely used in numerous industries, most important among them being Building & Construction (25% of the total market), Packaging (24%), Furniture (19%) and Individual and Mass Transportation (13%).



In Building & Construction there is a clear need for low-cost, energy-efficient houses that can be built quickly. Modular and lightweight structures with integrated foam insulation are increasingly being used, replacing traditional building concepts.



For economic and societal sustainability reasons, companies must design packaging so that it uses just enough material to ensure that the foods and goods they contain survive the distribution chain and are delivered to consumers in the best possible condition. Polymer foams support these material reduction needs while maintaining required packaging property profiles.

Taking weight out of a car is important in reducing fuel consumption. Low noise and high comfort are important for occupant convenience when travelling. Foamed solutions can meet these key requirements and offer additional functionality.





### **SABIC puts the polymer foam value chain into sharp focus**

SABIC is increasing its focus on key market segments. This focus is part of a transformation program to accelerate implementation of its corporate 2025 strategy to become the world preferred supplier in the chemical industry. SABIC has identified “foaming and lightweighting” as an important focus area, where its numerous polymer-based solutions can help the entire value chain become more efficient, more sustainable and more profitable.

SABIC’s diverse product portfolio reflects its customer-driven focus and its commitment to developing innovative and high quality foam solutions that are designed to last. SABIC is committed to the development of innovative solutions that go beyond its already established foam solutions portfolio.

SABIC’s intensified focus on foams will cover not only the converters, but the entire value chain. It has put in place dedicated business, marketing and sales teams, together with technical and compliance experts, to offer insights on customized applications and solutions with the most added value. This new set-up will enable a more focused and faster implementation of solutions to meet the needs of customers and partners around the world.

### **How does SABIC focus on foam technology?**

With over 35 years of experience in foams, SABIC has a significant share of the market for foamable polyolefins, thanks in large part to its ability and willingness to tailor grades for the specific needs of the market. These grades are already made in Europe and now also in Saudi Arabia, enabling SABIC to supply customers all around the world. SABIC also supplies polystyrene foam solutions into the Middle East and Africa (MEA) market from its operations in Saudi Arabia.

SABIC already has an extensive and growing network involving partners from machine suppliers, foam producers and converters, additive suppliers, institutes and universities, and other parties actively involved in the foam production and conversion chain. This has put SABIC in a strong position to understand the foam market, its needs and drivers.

SABIC has recently redrawn its roadmap for foams to encompass the following:

- Expansion of its current portfolio beyond polyethylene, and polystyrene to include more polyolefins, such as polypropylene, polyolefin elastomers (POEs) and polyolefin plastomers (POPs), and engineering thermoplastics;
- Collaboration through the value chain to generate a fullest possible set of solutions for polymer foams;
- Dedicating a Global Innovation Center to Foam & Lightweight;
- Leveraging its European market position globally.

### **Extending the possibilities in polyolefins**

Polyolefin plastomers POPs and polyolefin elastomers POEs are important additions to SABIC's portfolio of foam solutions. The biggest outlet for these polymers is currently as additives in other solid polymers, where they improve properties such as impact resistance. They can also be used in foam grades to enable production of foams that are more flexible and resilient, especially at low temperatures. SABIC is currently developing POP and POE grades for use in foams.



### **Beyond polyolefins and foam extrusion**

SABIC is very strong in polyolefins for extruded foams, where use is often made of their flexibility. But more rigid applications normally require the use of different process technologies, such as injection molding and blow molding. SABIC is developing foaming solutions for these processes as well, catering for latest down-gauging and lightweighting trends that are most evident in the automotive industry. Here, solid plastics have already replaced metals in many applications, and now foamed solutions are further reducing the weight of automotive products. SABIC intends to take a leading role in future collaboration with partners to advance the use of foaming technologies in part molding.



Many machinery suppliers already offer special physical foaming equipment for production of cellular injection molded and blow molded parts. But optimum solutions come through matching process technologies with tailor-made resin recipes. SABIC is looking into new lightweight solutions and modifying resins to make them more suitable for these “hybrid” processes.

SABIC also has foamable grades of such engineering plastics as polycarbonate, modified PPE (Noryl®) and PEI (Ultem®), for high-end applications in such areas as aviation as well as in various areas in land transport. These materials make possible such products as sandwich panels with foam cores that combine very high strength with low weight, as well as enhance flame retardance. SABIC® Lexan Light F6L300 thermoformable sheet for example, is 40% lighter than solid sheet.

### **Meeting value chain needs through state-of-the-art solutions**

Close collaboration with customers has enabled SABIC to build up a large bank of knowledge on the various foaming processes, and to develop dedicated grades that better meet customer needs. Now, SABIC is creating new state-of-the-art solutions that will enable producers and converters to make better foams and foamed products, even more cost effectively. Several breakthrough innovations are in the process of being commercialized. The first fruits of this more focused approach are already visible in several newly developed polyolefin grades.

SABIC® LDPE 2502X0, for example, offers special benefits for the physical foam extrusion process, as well for the resulting lightweight foams. The material is less sensitive to web breaks and foam collapse compared to current materials, resulting in a higher material yield during processing. The SABIC foams produced have a higher compression strength and better resilience, as well as lower foam density, compared to similar materials.

SABIC® LDPE 2402CX0 offers benefits for crosslinkable (XL) foam extrusion processes, and the corresponding crosslinked lightweight foams. This material shows a unique controlled reactivity combined with outstanding quality consistency, resulting in very stable processing with higher material yields. The XL foams have an improved properties-to-weight ratio, offering the possibility to use them in higher added-value applications.



### **More innovations ahead**

SABIC is also developing technologies to increase productivity at foam producing customers. Extruded foams currently have to be held in storage, sometimes for as long as ten days, after production in order for them to stabilize as the blowing agent escapes from the foam cells and is replaced by air. Only then can they be cut and laminated for further conversion. SABIC now has a breakthrough solution, already validated with key customers, that enables the foams to stabilize in just a few days. This will provide a considerable saving in time to market and is likely to free up large areas of storage space at producers and increase storage efficiency.

This advance is aimed mainly at the packaging foam market, but is applicable as well to foams produced for various applications in different markets. This is particularly important, since SABIC foam producing customers are generally supplying to multiple industries.

Further innovations in polymer foams are already being planned and executed at SABIC's new Foam Innovation Center in the Netherlands. This Center is equipped with most foam process capabilities as well as analytical equipment, enabling SABIC to carry out developments on new foam solutions, technology innovations and collaborative projects with customers, to reduce the material footprint, enable energy and cost reductions, and decrease time to market.

In SABIC's Home of Innovation in Saudi Arabia, SABIC is already showcasing the latest solutions for its polymer and foam solutions. It continues to push the boundaries of technology to discover even better, more sustainable energy-saving solutions.

With its emphasis on innovation and its extensive experience and expertise in development and production of numerous types of thermoplastics for foams used across many sectors, SABIC sees itself as a strong partner that can be relied upon to provide advanced, high quality, sustainable solutions for its customers – and to open the door to new possibilities.

SABIC's dedicated team for foams can be reached at [foam@sabic.com](mailto:foam@sabic.com).