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## **Development of new TPV sponge materials and foaming systems for dynamic automotive weatherseals**

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Dynamic automotive door seals are complex components generally constituted of a low-density sponge profile co-extruded onto a dense metal carrier. These seals contribute to the comfort inside the car, by insulating from water and aerodynamic noises. They control the door closing force, assessed by load deflection measurements, and the long term sealing performance, assessed through compression set testing.

Thermoplastic elastomers have started penetrating automotive weatherseal applications, offering light weight, easier processing at transformer and recyclability. But TPV sponge seal have been limited in comparison to existing technology, by several issues like rough surface aspect, high water absorption, compression load deflection, and compression set.

In this paper, we describe general principles of foaming technology suitable for thermoplastic elastomers, focusing on a new technique of foaming TPV by super critical fluid that create a closed microcellular structure, and thus reduces dramatically water absorption and offers better surface aspect.

In a second stage, we introduce a TPV composition adapted to this super critical fluid foaming technique that provides a controlled cell morphology and improved performance.

We believe that this new foaming process used in combination with a specially designed TPV grade can offer the performance required for dynamic automotive sealing systems.