



It's all about the right mix

Assessments of trends and developments relating to materials

Cross-industry raw materials / mixtures - Materials for seals, molded parts and profiles - no matter for which application it is all about the right mix.



The automotive industry is a key driver for the development of new materials. While increasing demands on internal combustion engines required new solutions in the past, today new drive systems such as electric motors, H₂ technologies, hybridization or alternative fuels have very specific requirements for materials. However, sole material development is often not enough for a proper solution. It is indeed the combination of new sealing designs and materials that meet the targets.

"In all material developments, the seal design must not be forgotten. For many new applications, a combination is required."

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One example is the miniature seal for H₂ hydrogen fuel cell regulators which also meets the challenge in terms of miniaturization technology. A very small, dynamic seal made of the high-performance material Polytetraflon®, a PTFE compound produced by a press-sintering process, which was specially developed for this high-pressure seal, is used here. In addition to the seal design, a strong characteristic is its high-pressure-stabilized seal material. The extreme stability of the seals against deformation and gap extrusion is achieved through the use of special fluor thermoplastic base materials in combination with stabilizers and fillers. The embedding of these inorganic and organic fillers is reinforced by the use of modified base materials. Different designs of the seals, e.g. the integration of support rings made of PEEK also prevent an extrusion into the gaps behind the seals. A stick-slip-free valve switching function is also possible through the use of these PTFE and PE-UHMW base materials. This is an absolute necessity in order to seal reliably these critical gaseous media.

This example shows the extent to which sealing technology is being challenged today as well as the constant developments of new solutions. Further challenges regarding the drive mix in the automotive industry are still yet to come.