New system for energy absorption made from Ultramid®: Crash-active engine cover for BMW

Case Study

For the 3.0 l 6-cylinder diesel engine in BMW's 7-Series, Montaplast, together with BASF, developed a novel crash-active engine cover with an integrated air filter and took 2nd place in the SPE Awards Powertrain category: Thanks to computer-aided modal analysis, empirical geometry optimization and dynamic component analysis conducted at BASF and an innovative energy-absorbing system from Montaplast, it was possible to meet the demanding component requirements. The large plastic parts are produced from dimensionally stable and tough Ultramid® B3WGM24 HP. At the same time, it has good sound-damping characteristics and offers such good surface quality that it can even be considered a design object in the form of an engine cover.

The energy-absorbing system for pedestrian protection consists of two parts: The two telescoping housing shells made of Ultramid® are elastic and rigid enough to actuate several conical elements into special TPU ring geometries made of Elastollan® (TPU) in the event of a head-on collision. In this case, the TPU is not only sealing material but also a built-in energy absorber. If the energy involved in the collision exceeds a certain level, the underlying fleece material used in the new air filter collapses, thus serving as an additional absorber. This creates a multi-stage energy absorber that, compared to so-called active engine covers, offers considerable cost advantages, integrates several functions, provides an attractive appearance and can be installed easily without tools by means of clips. Montaplast produces the novel engine cover with the built-in air filter via two-component injection molding.