First thermoplastic oil tank for dry sump engines worldwide

Case Study

The world's first thermoplastic oil tank for dry sump engines has now been developed by Hummel-Formen, a brand by ElringKlinger AG at Lenningen, Germany. The reservoir, which weighs around 2.6kg, is made from Ultramid® A3WG7, a BASF polyamide 66 with 35% glass fiber reinforcement which is resistant to oil and thermal aging. The tank is therefore 59 percent lighter than previous steel or aluminum welding constructions and has an improved, multi-functional oil separation system which is integrated in the tank. The complex plastic component is used in the new Mercedes-AMG GT, which has been available since spring 2015 and is the second car that AMG has developed itself.

The oil reservoir is noted for its ingenious geometry: It comprises ten different, injection-molded polyamide parts, which are joined together with 13 further elements like sensors, sieves, covers and screws to form one component. This is done by vibration welding and various snap-in mechanisms. By optimally using the available space, a lot of different functions could be integrated: Apart from the mere storage of the oil, the component deals with the ventilation of the crankcase including the oil separation, makes possible the filling and changing of the oil as well as controlling the oil level and its quality. Furthermore, it also slows down and roughly filters the incoming oil. The Ultramid® used shows high resistance to oil and corrosion, is thermally stable up to 180°C (for short periods even up to 240°C) and contributes to a favorable vibration and acoustic behavior because of its high damping and stiffness. This means that the plastic oil tank is considerably quieter than metallic versions. The tried-and-tested PA66 also displays the rigidity required for this application and necessary to withstand the requested burst pressures.