

Functional integration of housing and electronics: sensor carrier made from hydrolysis-resistant Ultradur® HR

Case Study

With BASF's hydrolysis-resistant PBT (polybutylene terephthalate) Ultradur® HR and BASF's know-how in ultrasonic welding, the company Rosenberger Spritzguss und Formenbau has now managed to develop a new type of carrier for hall effect sensors. It combines the housing and printed circuit board in one component and is injection-molded in a single, fully automated production step. A PET membrane, which is welded into the housing, provides the pressure compensation required in the event of climate changes. When combined with the BASF PBT that is resistant against air humidity, the service life of the component is thus extended. The carrier completes the control gearbox; the welded hall effect sensor measures the position of the valve in the exhaust gas recirculation. The whole component is mounted as a cover on exhaust gas recirculation modules which are fitted as standard in many automobiles in Europe.

Ultradur® B 4330 G6 HR (HR = hydrolysis resistant) is noted for its high resistance to hydrolysis in damp-warm environments and thus extends the service life and tightness of the component considerably – including in the temperature range from -40 to 140°C which is demanded by automotive manufacturers as a result of an ever more compact design in EGR and the engine compartment. Ultradur® B 4330 G6 HR also shows a substantially increased resistance to alkaline media, which trigger stress corrosion cracking. The plastic can be processed without any problems.

The sensor cover measuring 10 x 8 cm is extremely tight, particularly because of the single-stage injection-molding process and the unique design: The printed circuit board is inserted into the mold for the housing and fixed in place so that it can be over-molded without any external holding-down devices.



This avoids weld lines which could leak in the event of fluctuations in temperature or air pressure. However, as these climate variations are unavoidable and trigger pumping effects in the housing, a thin PET membrane is welded into the sensor cover: The membrane, which has a diameter of around 1.3 cm, is attached to the PBT housing by ultrasonic welding. It is permeable to air, but water-tight and thus provides the required pressure compensation.