

Siemens VDO uses Ultradur[®] plastic in new air flow sensor

Case Study

A new mass air flow (MAF) sensor developed by Siemens VDO Automotive AG is being used by two large European car makers. The Siemens SIMAF SP/1 sensor, part of the engine management system, is significantly smaller and more accurate than its predecessor, and offers design flexibility. The main plastic parts of the sensor assembly are moulded from Ultradur[®].

The new MAF sensor consists of a transducer and electrical connector. These parts are moulded separately and joined together afterwards. Such a flexible design strategy allows a variety of electrical connectors to be used according to the individual requirements of the car makers. The transducer is a three-piece assembly comprising a carrier and snap-on cover to hold the electronics and protect them from any dirt present in the air intake tract – and a duct that directs a steady, non-turbulent stream of air into the transducer. The resin from which the duct is made exhibits particularly good dimensional stability and so contributes to measurement accuracy. The sensor is both small and compact, allowing it to be located at various points in the intake tract, or integrated directly in the air-filter housing if necessary.

Although it appears not to be so at first sight, the sensor is quite a complex part. Its manufacture uses two grades of Ultradur[®], three different joining technologies—laser welding, vibration welding and snap-fitting—and a laser marking operation. The black components are moulded from Ultradur[®] B4300G6 LS, a laser-markable PBT with a 30% glass-fibre content. Since the duct is laser welded to the carrier, Siemens VDO chose the uncoloured, laser-transparent Ultradur[®] B4300G6. The electrical connector is vibration-welded to the transducer and then fitted with a cover. Ultradur[®] is a popular choice for automotive electronic applications—particularly those in the engine compartment—thanks to its good resistance to high temperatures and chemicals as well as dimensional stability and heat deformation resistance.

What does a MAF sensor do?

The mass air flow sensor measures the amount of air drawn into the engine. This information is used by the vehicle's engine management system to optimize the air/fuel mixture for more efficient combustion, lower emissions and reduced engine load.

