Plastic air and oil module for trucks made of Ultramid®

Case Study

BASF's engineering plastic Ultramid® has found use in two parts of the DD13®/DD15® truck engine charge-air section: In the charge-air duct and in the oil intake module.

The charge-air duct is made from Ultramid® A3W2G6. The component, which is produced by ElringKlinger offers high mechanical and thermal capabilities and exhibits compared to its aluminum predecessor also a weight reduction by 1.8 kg. Furthermore the polyamide 66 specialty is highly heat-aging resistant. This is confirmed by its performance in pulsating pressure tests at 140°C. The charge-air duct must survive 3,000 hours of pressure fluctuations between 0.4 and 3.5 bar. They arise from the mixing of turbocharged fresh air with the hot up to 230°C recirculated exhaust gas, so that peak temperatures of up to 200°C can occur.

The oil intake module on the DD13®/DD15® also presents demanding challenges for the material. It is made from Ultramid® A3WG7 and, in addition to the oil intake connection and oil supply line, incorporates an integrated check valve. In the component test, the aged material has to withstand over 10 million oil pressure pulsation cycles between 5 and 13 bar at 120°C. In long-term testing of the check vale, 500,000 cycles must be withstood in the presence of a sharp oil mixture that contains not only aged engine oil but also fuel components.