Case Study

First WIT coolant pipe made of Durethan® DP AKV 30 X HR EF

Figure 1 BMW coolant pipe

Material: Durethan® DP AKV 30 X HR EF

Molder: HEYCO GmbH & Co. KG, Germany

OEM: BMW, Germany

Industry: Automotive

HEYCO, headquartered in Remscheid, is a leading supplier of products and services for the metal and plastics processing industry. The company is a skilled provider of modules and systems for the automotive industry and its suppliers. The continuously expanding product portfolio ranges from components and modules for the bodywork and interior to high-temperature-resistant components for engine control.

Figure 1 shows the first coolant pipe made of the LANXESS plastic Durethan® DP AKV 30 X HR EF, manufactured using water injection technology (WIT). Customarily, pipes of this kind have been produced using gas injection technology (GIT). Based on experiences with GIT, water injection technology replaces the process medium gas (usually nitrogen) with water to inflate the melt in the mold. Unlike gas, water offers the advantage of high thermal conductivity, enabling significantly shorter cycle times.

Furthermore, water injection technology also enables larger diameters with lower and uniform residual wall thicknesses, thus reducing the weight of components – a crucial factor in the automotive industry.

The coolant pipe shown above is used in BMW 4-cylinder diesel engines.

Durethan® DP AKV 30 X HR EF was specifically developed for this application. It contains 30 % of a special glass-fiber mix and offers excellent processing properties in the WIT process. The mix is vital and results in excellent inner and outer surfaces. The inner surface plays a major role in this application, as it is vital that the material does not exhibit any blisters, swirling or voids that would provide a point of attack for the medium flowing through the component and thus increase the flow resistance. In this context, Durethan® DP AKV 30 X HR EF also boasts excellent hollowing properties.

An additional strength of the material is its excellent resistance to common engine chemicals. Its hydrolysis resistance to commercial engine coolant is particularly high. In tests, the coolant pipe withstood

constant media temperatures of 125 °C and short-term temperature peaks of 143 °C and therefore met the tightness and surface quality requirements. The thermoplastic also proved its long-term durability after longer periods of media contact under changing conditions at a pressure of 5 bar and temperatures of -40 to +135 °C.

LANXESS gave HEYCO extensive support in developing the coolant pipe for BMW. Its services included analyses of the material's media resistance, pulsating compression and pressure flow tests on the prototype, and process support all the way to the start of production.
