

## Case Study

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



Figure 1 BMW coolant pipe

[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 resid-

**Material:** Durethan® DP AKV 30 X HR EF  
**Molder:** HEYCO GmbH & Co. KG, Germany  
**OEM:** BMW, Germany  
**Industry:** Automotive

ual 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.

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#### Typical Properties

Property data is provided as general information only. Property values are approximate and are not part of the product specifications.

#### Health and Safety

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling LANXESS products mentioned in this publication. Before working with these products, you must read and become familiar with the available information on their hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets (MSDS) and product labels. Consult your LANXESS Corporation representative or contact the Product Safety and Regulatory Affairs Department at LANXESS. For materials that are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturer(s) must be followed.

#### Regulatory Compliance

Some of the end uses of the products described in this brochure must comply with applicable regulations, such as the FDA, NSF, USDA and CPSC. If you have any questions on the regulatory status of any LANXESS engineering thermoplastic, consult your LANXESS Corporation representative or contact the LANXESS Regulatory Affairs Manager.

#### Regrind

Where end-use requirements permit, regrind may be used with virgin material in quantities specified in individual product information bulletins, provided that the material is kept free of contamination and is properly dried (see maximum permissible quantities and drying conditions in product information bulletins). Any regrind used must be generated from properly molded/extruded parts, sprues, runners, trimmings and/or film. All regrind used must be clean, uncontaminated, and thoroughly blended with virgin resin prior to drying and processing. Under no circumstances should degraded, discolored, or contaminated material be used for regrind. Materials of this type should be discarded. Improperly mixed and/or dried regrind may diminish the desired properties of a particular LANXESS product. It is critical that you test finished parts produced with any amount of regrind to ensure that your end-use performance requirements are fully met. Regulatory or testing organizations (e.g., UL) may have specific requirements limiting the allowable amount of regrind. Because third party regrind generally does not have a traceable heat history or offer any assurance that proper temperatures, conditions, and/or materials were used in processing, extreme caution must be exercised in buying and using regrind from third parties. The use of regrind material should be avoided entirely in those applications where resin properties equivalent to virgin material are required, including but not limited to color quality, impact strength, resin purity, and/or load-bearing performance.

#### Note:

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