

## Case Study

### Coolant expansion tank in Durethan® DP AKV 30 HR H2.0



Fig. 1 Coolant expansion tank

In addition to its original line of business in hand-operated tools, **HEYCO** is also a well-known supplier of plastic parts and forged components for the automotive industry. Customers value HEYCO as a competent development partner for modules and systems. With its 800 employees, the company produces technically sophisticated, high-quality components, including complex parts for the automotive cooling circuits.

The function of the coolant expansion tank shown in Fig. 1 is essentially to accommodate the expanding coolant from the rest of the cooling circuit as the coolant heats up. It also allows the coolant to be topped off via the filler neck and indicates the coolant level. The component consists of two large shells which are joined together by vibration welding.

The expansion tank is made of Durethan® DP AKV 30 HR H2.0, a 30 % glass fiber reinforced heat- and hydrolysis-stabilized polyamide 66 from LANXESS. This thermoplastic fulfills the following requirements that are placed on the application:

**Grade:** Durethan® DP AKV 30 HR H2.0

**Manufacturer:** HEYCO-WERK Heynen GmbH & Co. KG, Germany

- high dynamic load bearing capacity
- very good resistance to cooling media and chemicals typically used in the engine compartment
- high heat resistance and heat distortion temperature
- excellent weld strength

The weld, in particular, is subject to a high level of stress since it is always in contact with hot coolant and is subject to static and dynamic loading due to pressure inside the tank.

The test program for the tanks therefore includes long-term immersion in a hot water/glycol mix, followed by burst pressure testing at up to 6 bar.

These requirements can be fulfilled more easily if special attention is paid to proper tank design, as was the case here.

LANXESS also provided HEYCO with support at the design stage, conducting comprehensive finite-element analyses which made it possible to design an optimized rib structure inside the tank.



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#### Developmental Product

Any product designated as a developmental product is not considered part of the LANXESS Corporation line of standard commercial products. Complete commercialization and continued supply are not assured. The purchaser/user agrees that LANXESS Corporation reserves the right to discontinue this product without prior notice.

#### 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:

The information contained in this publication is current as of July, 2010. Please contact LANXESS Corporation to determine if this publication has been revised.

