

## Unreinforced Durethan® polyamides for tank systems

### Use of melt filters

Fuel tanks and high-pressure storage systems (such as Compressed Natural Gas (CNG) tanks) are safety-relevant components. If fuel should leak in the event of damage, an elevated safety risk exists that must not only be taken into account during the design and development of the tank, but also when developing its manufacturing processes.

The components of a tank system must be subjected to critical loading conditions during the design and testing phase so that the effects can be evaluated. One example of a critical load case for a motorcycle tank would be a crash or accident in which the component is exposed to impact forces. As a substitute for real-world tests, the tank must at least pass a pendulum impact test, usually under extreme conditions (low temperature, non-conditioned material) in order to ensure the suitability of the component for use in production vehicles. During the testing phase, critical areas with maximum stress and strain must be identified. Computer simulation of load conditions (e.g. via finite-element analysis) can provide additional information on these critical locations.

To minimize safety risks, highly stressed areas must be detected, and an appropriate check of the quality of these areas must be integrated into the production process. Manufacturing defects must be identified especially in areas of high stress by using suitable methods, e.g. spectrography. As these defects are identified during the manufacturing process, appropriate action must be taken to keep these parts from being used in production vehicles.

In addition, the possibility of material contamination must be taken into account during the entire manufacturing process. To minimize the contamination risk for the raw material (compound), LANXESS has implemented special precautions in the manufacturing pro-

cess of selected products. They involve special preparation and cleaning sequences prior to compounding, and intense monitoring of downstream processes all the way through to packaging. Products fabricated by this method have "DUSXBL" added to their product name. Despite these measures, contamination cannot be ruled out 100% of the time on the way to the finished component.

We therefore recommend the use of melt filters. By using melt filters, contaminants larger than the selected mesh sizes of the filter can be effectively retained.

In addition, filtration can achieve thermal and material homogenization, and filter out any residual, unmelted plastics.

Filtration is particularly necessary for high-pressure systems, and suitable quality inspections must be established.

Apart from the possibility of contamination, local material inhomogeneity can occur in highly impact-modified grades due to the complexity of the formulations. High-molecular weight or partially cross-linked polymer fractions generated during polymerization, compounding and processing, which are incorporated into the matrix (so-called gel bodies), may cause effects on the visible surface. These effects can occur with processing techniques like extrusion blow molding because the pressure of the plastic against the surface of the mold is much lower than with injection molding. In addition, the heat extraction rate is reduced because the inside of the component does not have contact with the mold. These pressure and thermal conditions can lead to visible pitting on the surface.

These sporadic surface effects can also be reduced by appropriate melt filtration.



The ability to save weight in vehicles by using plastics such as Durethan<sup>®</sup>, Pocan<sup>®</sup> and Tepex<sup>®</sup> leads to increased fuel efficiency and the associated reduction in CO<sub>2</sub> emissions.

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The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee, and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

#### 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 August, 2015. Please contact LANXESS Corporation to determine if this publication has been revised.