

Case Study

Electronic junction box made of Pocan® T 7391



Figure 1 Electronic junction box

The main activities of the Mecaplast Group include the design, development and production of innovative automotive equipment for the European market. In fact, Mecaplast is one of the leading manufacturers in this field. The company supplies plastic components for automotive interiors and exteriors to a range of car manufacturers as well as Volvo Trucks and Renault Trucks.

The illustration above shows a new application for trucks – the electronic junction box. This is installed between the driver's cab and the engine compartment and is the interface to the central electronics, located behind it. Electronic components, some of which can also be mounted on the box, can weigh up to 3 kg. This box, which is manufactured by Mecaplast in France, was originally made of welded sheet metal. It is now made of Pocan® T 7391 from

Material: Pocan® T 7391
Molder: Mecaplast Group, France
Oem: Volvo Trucks, Renault Trucks
Industry: Automotive

LANXESS, an engineering thermoplastic reinforced with 45 % glass fibers.

The electronic junction box is subject to particularly demanding technical requirements. As the interface between the driver's cab and the engine compartment, it is subject to strong vibrations but must still remain extremely stiff. The conditions are made more difficult by the fact that the box must withstand temperatures up to 70 °C. Compared with steel, which involves a complicated design, it is both easier and more cost-effective to manufacture the box out of Pocan® T 7391.

Pocan® T 7391 has been used for the junction box of the new Premium truck from Renault Trucks since the start of 2006. The box is to be installed in other truck models, such as the Midlum from Renault



Trucks and the Volvo FL and FM from Volvo Trucks, from the end of 2006.

The electronic junction box is the biggest and heaviest PBT application to be made from a LANXESS plastic for the automotive industry to date. It is 580 mm high and weighs 1.7 kg. In view of the demands made on this product and the weight and size that result from this, the low tendency to creep and high dimensional stability of Pocan are crucial properties.

The high stiffness of Pocan® T 7391 is impressive. The shear modulus curve (see Diagram 1) provides information on the linear elastic deformation. The torsion pendulum test shows very good values due to the high glass fiber content.

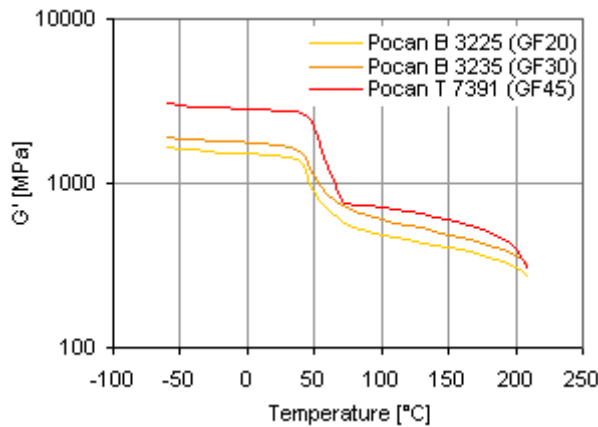


Diagram 1 Dynamic Shear modulus-temperature curves

Diagram 1 shows shear modulus curves for three products with different glass fiber contents – Pocan® T 7391 (45 %), Pocan® B 3235 (30 %) and Pocan® B 3225 (20 %).

The exceptional stiffness can also be seen clearly in the following diagrams.

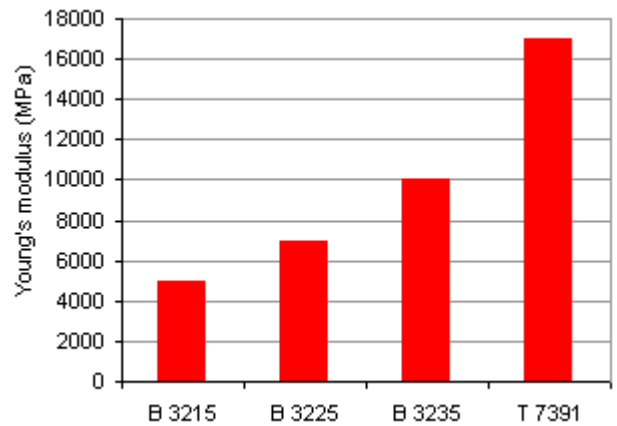


Diagram 2 Relationship between E-modulus and GF content

Diagram 2 shows an above-average increase in the elasticity modulus compared with other glass fiber-reinforced Pocan grades.

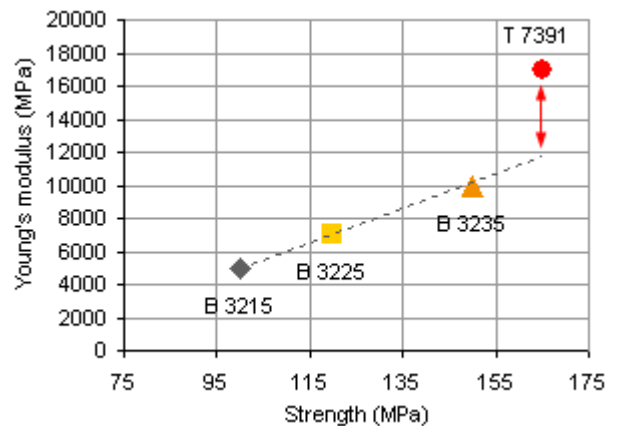


Diagram 3 Relationship between E-modulus and strength

Diagram 3 confirms the exceptional qualities of Pocan T 7391. Comparing these products reveals a dependency between the E-modulus and the glass fiber content – the higher the glass fiber content, the greater the stiffness and strength. Pocan T 7391 has outstanding qualities. If the values were connected linearly, the strength of Pocan T 7391 ought to be lower. However the result is significantly higher than expected.



In addition to its high stiffness and strength, Pocan T 7391 has other impressive features, such as...

- Good surface quality
- Low tendency to creep – results in high dimensional stability
- Reduced tendency to warpage
- High level of toughness
- High stability at temperature peaks

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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.

Typical Properties

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

Flammability

Flammability results are based on small-scale laboratory tests for purposes of relative comparison and are not intended to reflect the hazards presented by this or any other material under actual fire conditions.

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.

Color and visual effects

Type and quantity of pigments or additives used to obtain certain colors and special visual effects can affect mechanical properties.

Note:

The information contained in this publication is current as of October, 2008. Please contact LANXESS Corporation to determine if this publication has been revised.

