

Case Study

Socket combinations made from (PBT+PC)-blend – low warpage with chemical resistance



Figure 1 AMAXX® Socket combinations

Offering “Plugs for the World” has made [MENNEKES Elektrotechnik GmbH & Co. KG](http://www.mennekes.com) one of the world’s leading manufacturers of standardized industrial plugs and sockets. This family business based in Kirchhundem in the Sauerland region of western Germany markets its products in over 90 countries. Its AMAXX® range provides ideal socket combinations for all kinds of applications. When deciding on a housing material for the latest addition to this range, MENNEKES opted for a non-reinforced, elastomer-modified blend of polybutylene

Material: Pocan®
Molder: MENNEKES
Elektrotechnik GmbH & Co. KG

terephthalate and polycarbonate (PBT+PC) from LANXESS. This thermoplastic from the Pocan product family was chosen primarily because of its excellent resistance to a large number of chemicals and its low warpage. This makes it possible to produce components with outstanding dimensional stability.

The (PBT+PC)-blend is much more resistant to fuel vapors, greases and many cleaning agents than PC, which is also used as a housing material. A further benefit is the blend’s good UV stability. Because the housing components are relatively large, the blend’s



good flowability pays off during processing, producing molded parts with a smooth, flawless surface that is easy to clean. The low isotropic shrinkage levels of the (PBT+PC)-blend, its minimal warpage and low water absorption yield components with excellent dimensional stability, ensuring a tight seal. This helps the housings remain impervious to splashing water and dust, enabling them to attain International Protection ratings of IP44 to IP67.

Thanks to the dimensional stability of the (PBT+PC)-blend under heat – it has an HDT A (Heat Distortion Temperature) value of 70 °C – the housing components demonstrate adequate stiffness at elevated temperatures. The blend also benefits from good

impact resistance at temperatures as low as -25 °C. This ensures that the housing components are able to withstand the rough treatment they receive on a daily basis, including knocks and bumps. The thermoplastic's good electrical insulating properties are also demonstrated by its high dielectric strength and tracking resistance.

Another key factor leading to the choice of this flame retardant-free material was its compliance with the EU's RoHS (Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) directives.



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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.

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 June, 2009. Please contact LANXESS Corporation to determine if this publication has been revised.

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