

Case Study

Durethan® DP 1803/10 for Safety Switches

PA 6, injection molding grade, 50 % mineral/glass fibers, halogen and phosphorus-free, GWIT 775 °C



Figure 1 Safety switch in Durethan DP 1803/10 H3.0

The electrical industry still uses primarily polyamides (PA) containing halogen for the production of circuit breakers, safety switches and contactors. LANXESS Deutschland GmbH has developed halogen-free grades of PA 6 with a property profile specifically tailored to the requirements on these parts.

Durethan DP 1803/10 H3.0 from LANXESS is a halogen-free, flame-retardant polyamide which provides optimum electrical insulation while, at the same time, offering a high level of flame retardance. This material is already being used for the housings of safety switches for domestic applications, which are produced by BTicino in Milan. In terms of electrical insulation, the material, with its mineral flame retardant, is superior to other thermoplastics with halogen or phosphorus-based flame-retardant pack-

Material: Durethan® DP 1803/10

Molder: BTicino, Italy

Industry: Electric/Electronics

ages, since it suffers virtually no carbonization even after repeated short-circuits, and consequently retains its high dielectric strength. This was demonstrated in a series of tests on safety switches made of Durethan DP 1803/10 H3.0. The switches were subjected to short circuits several times over with a current of three kiloamps. After this, even when a voltage of 1500 volts was applied, no disruptive discharge, or breakdown of the electrical insulation, occurred.

A further positive feature of Durethan DP 1803/10 H3.0 is its good processability and flowability, despite the mineral additive. This material can therefore be used to produce molded parts with wall thicknesses in the region of only 0.75 mm.



The material has very good flame retardance, as demonstrated in the test to establish the glow-wire flammability index (GWFI), in which it fulfils the requirements at the maximum glow-wire temperature of 960 °C. Durethan DP 1803/10 H3.0 passes the glow-wire ignition temperature (GWIT) test at 775 °C in all standard specimen thicknesses. Durethan DP 1803/10 H3.0 can thus also be employed in accordance with the extended IEC 60335-1 standard for household appliances, which applies to live parts

in unsupervised domestic appliances such as washing machines and dishwashers, and in circulation pumps (for heaters).

The comparative tracking index to CTI A is well above 450 volts – a higher level than that achieved by general-purpose polyamides with halogen-containing flame retardants. There is thus only a very small risk of short circuits or appliance faults due to leakage current.

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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.

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.

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