

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 packages, 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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Unless specified to the contrary, the values given have been established on standardized test specimens at room temperature. The figures should be regarded as guide values only and not as binding minimum values. Kindly note that, under certain conditions, the properties can be affected to a considerable extent by the design of the mould/die, the processing conditions and the coloring.

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