

## Case Study

### USB socket



Figure 1 USB socket

The polyamide 66 Durethan DP AKV 30 FN00 from specialty chemicals group LANXESS is proving extremely successful as a material for flame-retardant components in consumer electronics in Asian markets. One reason is that many equipment manufacturers in the industry are now voluntarily agreeing to give preferential treatment to plastics with halogen-free flame retardancy properties. Polyamides whose additives are not only flame-retardant but also free of red phosphorus have been especially popular in recent times. The material meets precisely these requirements. It achieves excellent ratings in flame retardancy tests, has a wide processing window for injection molding and is perfect for components with very thin walls such as plug connectors, coil formers and tiny USB plugs.

Many manufacturers of consumer electronics have stopped using halogenated flame-retardant plastics in a bid to become more ecofriendly. Their aim is to improve their image among end consumers by boosting the sustainability of their operations. More and more companies are opting for halogen-free flame retardant plastics that contain no red phosphorus because of its inherently dark color, which prevents the corresponding components from being given a light color. Color is a crucial design element and a safety feature in many applications. Red phosphorus can also cause corrosion when it comes in contact with metals in warm or moist conditions.

**Grade:** Durethan® DP AKV 30 FN00

**Manufacturer:** Hyupjin INC, Korea

Tests conducted in accordance with standard UL 94 of the U.S. testing organization Underwriters' Laboratories (UL) confirm the high flame retardancy of Durethan DP AKV 30 FN00. Test pieces between 0.4 and 3 millimeters thick passed the test and were awarded the classification V-0. Moreover, the thermoplastic is difficult to ignite and has a short flame time. At 960 °C, it achieved the best possible GWFI (Glow Wire Flammability Index) value for plastics in the glow wire test pursuant to IEC 60695-2-12 based on test piece thicknesses of between 0.8 and 3 millimeters. In the HWI (Hot Wire Ignition) and HAI (High Amp Arc Ignition) tests, the material was classified in the best performance level category (PLC 0), even at a test piece thickness of 0.4 millimeters. This makes it highly suitable as an insulating material in line with UL standard 508.

The electrical properties of polyamide 66 are also rated very highly. For instance, its CTI A (Comparative Tracking Index, IEC 60112) value of 600 volts means it is very tracking resistant and therefore boasts the best possible classification (PLC 0) on the UL Yellow Card. The risk of short circuits and equipment faults resulting from leakage currents in applications is thus greatly reduced.

Even in air, this material, which is reinforced with 30 percent glass fibers, has high heat resistance in continuous use. Tests to assess compliance with UL 746 B are currently under way and excellent

Yellow Card values are expected for the Relative Thermal Index (RTI) with respect to all three load types specified in the standard. The material also boasts impressive mechanical properties. The high Izod impact strength (ISO 180-1U) of 55 kJ/m<sup>2</sup> is just one noteworthy example.

The new polyamide 66 was designed to have a broad processing window for injection molding. This material can easily cope with wall thicknesses of well under one millimeter – for instance in plug connectors. The material is used instead of flame-retardant PBT, polyamide 46 and polyphthalamide in many applications.

---

This information and our technical advice - whether verbal, in writing or by way of trials - are given in good faith but without warranty, and this also applies where proprietary rights of third parties are involved. Our advice does not release you from the obligation to verify the information currently provided - especially that contained in our safety data and technical information sheets - and to test our products as to their suitability for the intended processes and uses. The application, use and processing of our products and the products manufactured by you on the basis of our technical advice are beyond our control and, therefore, entirely your own responsibility. Our products are sold in accordance with the current version of our General Conditions of Sale and Delivery.

Trial Products (grade designations beginning e.g. with the codes DP, TP, KL or KU):

These are sales products at the developmental stage (trial products). For this reason, no assurances can be given as to type conformity, processability, long-term performance characteristics or other production or application parameters. No definitive statements can be made regarding the behavior of the product during processing or use. The purchaser/user uses the product entirely at his own risk. The marketing and continued supply of this material are not assured and may be discontinued at any time.