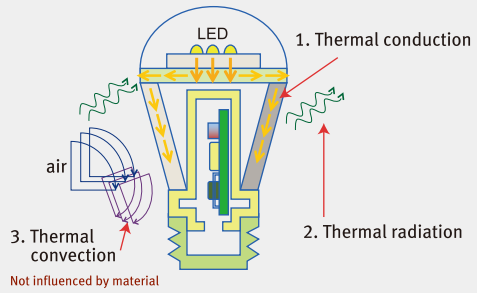
NEW DUPONT THERMALLY CONDUCTIVE POLYMERS DRIVING AL DIE-CASTING REPLACEMENT AND PART INTEGRATIONS

Unique Combination of Thermal Conductivity, Mechanical Properties and Electrical Insulation



	Al alloy	TC-resin	Normal resin
Thermal conductivity (W/m.K)	high	middle	low
Thermal radiation	low	high	high

Fig 1: Types of Thermal transfer in LED bulbs.

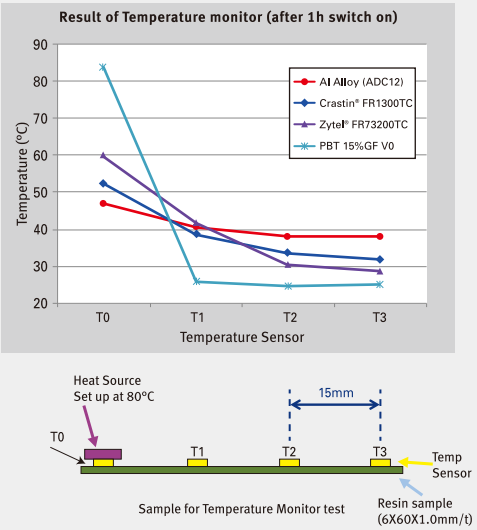


Fig. 2: Heat transfer comparison of TC polymers vs Standard PBT and Al Alloy.
Note: Higher temp on T1, T2 and T3 means better heat transfer performance.
Ideal case : T0=T1=T2=T3 Internal test done at DuPont Technical Center.

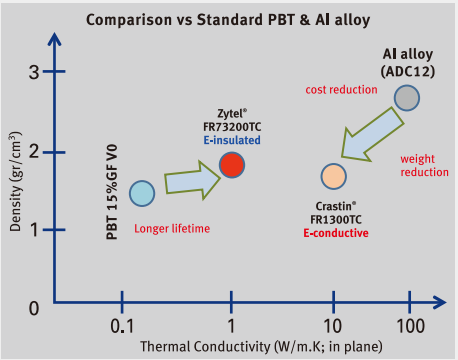


Fig 3: Thermal Conductivity and Density comparison of TC polymers vs Standard PBT and Al Alloy.

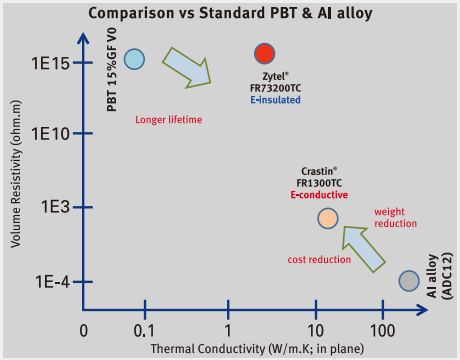


Fig 4: Thermal Conductivity and Volume Resistivity comparison of TC polymers vs Standard PBT and Al Alloy.

MARKET TRENDS

Due to the miniaturization and increasing power of microelectronics, heat dissipation is key to the reliability, performance and further miniaturization of microelectronics. Materials with high thermal conductivity are required for the conduction of heat for the purpose of cooling.

In applications where thermal conductivity is the limiting factor, metals remain the favored materials. However, in the many applications where convection is the limiting factor, thermally conductive plastics are increasing the preferred choice.

WHY THERMALLY CONDUCTIVE POLYMERS ARE NEEDED?

Striking a good balance between Thermal Conductivity (TC) and thermal radiation, thermally conductive polymer technology encourages metal replacement and part integration to help reduce the total cost and lower device weight. It facilitates the development of energy-efficient systems with concern for environment sustainability. (refer to Fig.1)

THERMALLY AND ELECTRICALLY CONDUCTIVE

Crastin® FR1300TC BK350

Electrically conductive PBT grade, V-0, High Thermal Conductivity (14 W/m.K, in-plane), low density, black colour, good balance of mechanical properties, for injection moulding.

THERMALLY CONDUCTIVE & ELECTRICALLY INSULATED

Zytel® FR73200TC WT001

Electrically insulated PA 6 grade, V-0, Thermal Conductivity (2 W/m.K, in-plane), white colour, F1 (suitable for outdoor applications), good balance of mechanical properties, for injection moulding.

FEATURES AND BENEFITS:

vs Al Alloys

- Potential cost and weight reduction
- Design flexibility enables part integration

vs Standard non TC resins

- Higher heat transfer which is translated into higher efficiency and lifetime of the final device

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Thermally Conductive DuPont Performance Polymers for TC Applications

			PROPERTIES				
Grade	Colour	Polymer Type	Thermal Conductivity in Plane (mm)	Volume Resistivity	Flammability Rating (mm)	GWIT (mm)	Density
Method			ASTM E1461	IEC 60093	UL 94	IEC 60695-2-13	ISO 1183
Units			W/m.K	Ohm.m		°C	gr/cm^3
Crastin® FR1300TC BK350	Black	PBT	14 (0.3)	>1E3	V0 (0.75)	675 (0.75) 750 (1.5) 960 (3.0)	1.58
Zytel® FR73200TC WT001	White	PA6	2 (0.3)	2.8E15	V0 (0.75)	775 (0.75) 800 (1.5) 825 (3.0)	1.80

* Thermally conductive specimen prepared by hot-press.

EXAMPLES OF POTENTIAL APPLICATIONS

- LED Lighting (e.g. bulb cover, driver casing)
- Hand Held Devices (e.g. laptops/tablets bottom covers)
- Battery (e.g. casing)
- Electrical Components (e.g. motor housings)
- LCD Projectors (e.g. heat sink)
- Auto Lighting (e.g. heat sink)
- PV Converters (e.g terminal block)

WE CAN HELP

DuPont is strongly committed to expansion and investment in environmentally friendly solutions. Please contact the DuPont representative in your country or global region to discuss how we can work together.

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