Application Note POLYMER018

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POLYMER018: Thermal Conductivity Evaluation Method for Various Sample Shapes

Introduction

Thermal conductivity of polymers is an important physical property that determines the cooling performance of electronic components and the functionality of insulation materials. However, some materials with softness and irregular shapes make it challenging to measure their thermal conductivity accurately. Trident can easily evaluate the thermal conductivity of actual sample shapes without cutting or processing, thus contributing to reliable thermal design at the design stage, even for materials that have been difficult to evaluate in the past, such as foam and sheet materials.

Thermal analysis

Analysis:	Parts and end products
Use:	Process control, failure analysis, quality assurance
Analyzed materials:	Melamine foam

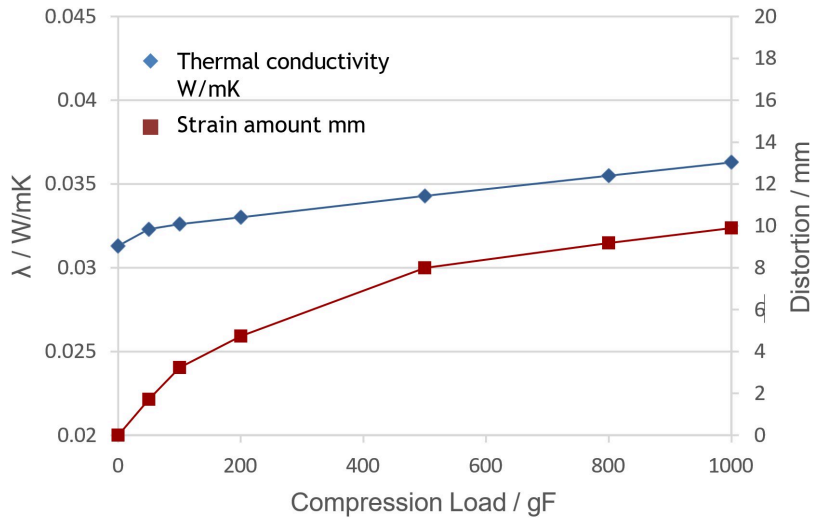
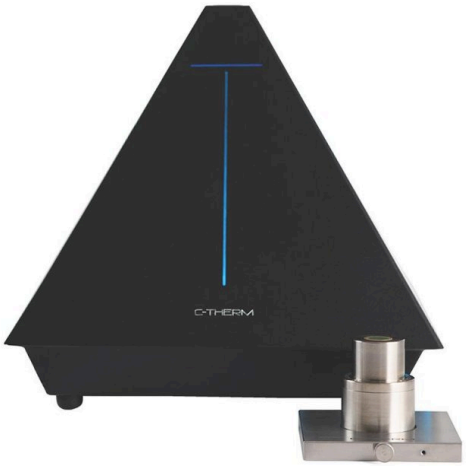


Figure 1: Relationship between external force, thermal conductivity and strain of melamine foam

Conclusion

For soft materials such as melamine foam, it was observed that external forces cause significant distortion and that the thermal conductivity also changes according to the compression state. In particular, the apparent thermal conductivity tends to increase with increasing strain, and steady-state measurements that ignore deformation in service risk underestimating the actual thermal behavior. Trident can be applied to such foam-like materials and quantitatively measures thermal conductivity in its deformed state, making it a highly reliable evaluation method directly related to product design and accurate estimates of thermal insulation and cooling performance.

Related products



TRIDENT

TRIDENT offers the ability to easily measure the thermal co nductivity of samples in seconds under representative test conditions. TRIDENT can test the thermal conductivity of so lid samples, liquids, pastes, gels, and powders.