



## DILATOMETRY

Glass Technology Services Ltd. is an independent laboratory providing a comprehensive range of services related to glass manufacture and use. Our services are backed by experienced, multi-disciplinary staff specialising in all aspects of glass technology.

Dilatometry is a thermo-analytical method for measuring the shrinkage or expansion of materials over a controlled temperature regime. Our dilatometer has the capability to accurately measure the thermal expansion of materials at temperatures between ambient and 1000°C in air or under an atmosphere.

The amount of expansion or shrinkage is dependent on the characteristics of the material itself. It is often very important to match the thermal expansion behaviour of different materials that are in contact with one another in order to avoid unwanted stresses and possible cracking. It is equally important to combine measurements of properties with an understanding of the process itself, expertise that is offered by GTS.

### WHAT CAN DILATOMETRY DO?

Most materials can be measured by dilatometry including glasses, ceramics, resins, polymers and metals.

Dilatometry allows measurement of the following properties:

- Thermal expansion and coefficient of thermal expansion,
- Sintering temperature and shrinkage steps
- Volumetric expansion
- Density change
- Glass transition temperature,  $T_g$
- Dilatometric softening point,  $T_d$
- Phase transitions
- Measurement available to BS7030 for glass, and to BS1902 for refractory materials



A customer producing articles manufactured from 2 different glasses fused together discovered during production that many articles were cracking, causing loss of production. Visual analysis of the articles by GTS suggested a mismatch in thermal expansion of the two glasses. Thermal analysis of the glasses by dilatometry allowed GTS to confirm this mismatch was outside acceptable levels. We were then able to offer our customer a solution to their problem by introducing a modified glass composition which allowed better matching of expansion coefficients.

### RELATED SERVICES:

- Differential Thermal Analysis (DTA) - For batch reactions, phase changes, glass transition values
- Littleton Softening Point - For ASTM standard method C338 and equivalents
- Liquidus Temperature - For crystallisation behaviour of glasses and ceramics
- High Temperature Viscosity - For measurement of the viscosity-temperature curve
- High Temperature Electrical Measurements – For high temperature resistivity

If you would like to know more about these, our other services, or any other aspect of glass technology please contact us.

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