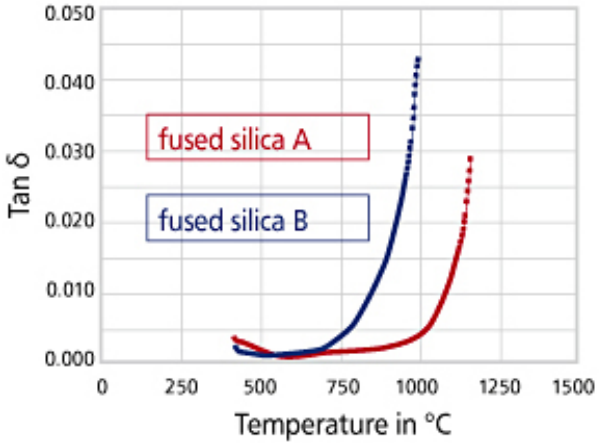
APPLICATION**SHEET**

Glass / Ceramics – DMA EPLEXOR®

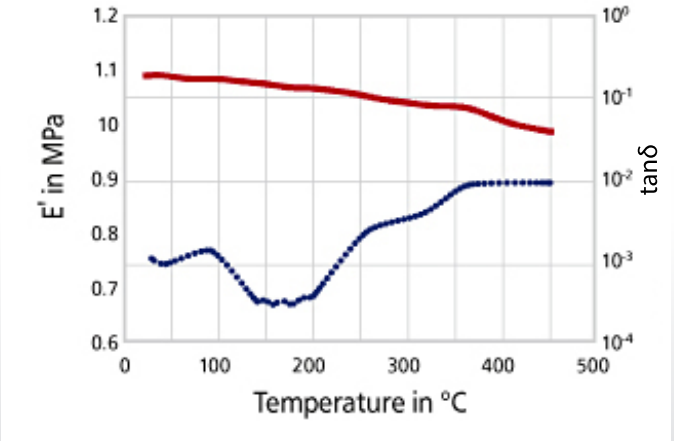
Investigations on Fused Silica

With the EPLEXOR® HT series, NETZSCH GABO Instruments GmbH shows worldwide the first DMA instrument providing a temperature range up to 1500°C. This class of instruments is aimed for providing investigations on glass, metals, ceramics and even high-temperature composite materials in the high-temperature range. The figure shows the test results obtained for different fused silica. Rectangular glass samples with dimensions of 5 mm (width) x 2 mm (thickness) x 30 mm (length) were investigated. For both samples, a test frequency of 1 Hz and a heating rate of 2 K/min were applied. The sample holder used for this test was a newly designed asymmetrical 3-point bending device. The damping properties (tanδ) as a function of temperature significantly differ from each other.



Resolution – With Which Accuracy Can tanδ Be Determined?

This picture shows storage modulus E′ and loss factor tanδ of a glass, measured in the 3-point bending mode. The experiment provides the low absolute values for the visco-elastic damping as a function of temperature. Such minimal tanδ values, corresponding to a phase shift between force and sample deformation, can only be determined with an extremely high resolution in the phase shift measurement. We therefore have equipped our EPLEXOR® series with high precision phase angle determination. The resolution is better than tanδ $\leq 10^{-4}$.



NGB · Application Sheet 270 · EN· 08/17 · Technical specifications are subject to change.

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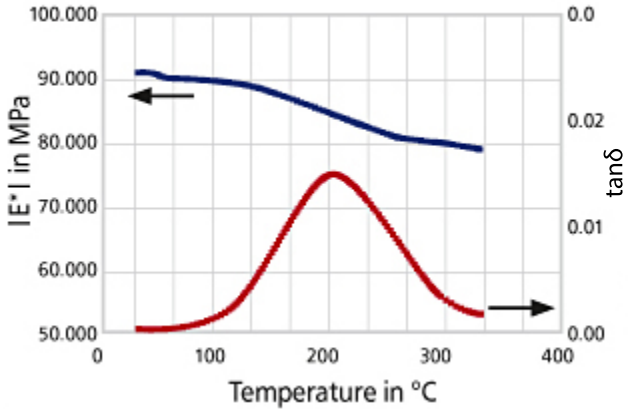
APPLICATION**SHEET**

Glass / Ceramics – DMA EPLEXOR®

A New Tool for Tests on Very Stiff, but Brittle Low-Damping Materials – Asymmetric 3-Point Bending Device

The picture shows the complex modulus E* and loss factor tanδ of a glass measured in the asymmetric 3-point bending mode. The observed tanδ peak with a maximum at 200°C (below the glass transition of over 400°C) has to be related to thermically activated molecular motions of the Na^+ ions within the glass.

Friction processes due to the interaction between the sample and sample holder can totally be suppressed. Therefore, the asymmetric 3-point bending device enables the user to investigate brittle low-damping materials (tanδ ~0.0002) with very high accuracy.



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