Noisetek ELASTE R

The Noisetek ELASTE product family provides adjustable epoxy-based vibration damping materials with an extremely high loss factor. These innovative visco-elastic materials are intended primarily for use in constrained-layer damping (CLD) systems to prevent the harmful effects of resonating vibration.

The Noisetek ELASTE R product is designed for applications at room temperatures and mid frequencies (> 100 Hz). As a visco-elastic material (like rubbers etc.) its material properties depend on frequency and temperature conditions.

Material parameters @ 23°C

Young's modulus (ISO 527)	1.7 MPa
Tensile strength (ISO 527)	0.7 MPa
Elongation at break (ISO 527)	60 %
Density	1050 kg/m3
Thermal conductivity	0.2 W/mK
Poisson's ratio	0.45

Durability

Thermal durability	Continuous 120 °C, Temporary 180 °C
Chemical resistance (for example oil)	Excellent, (no changes 480h @ 80°C SAE 10W30)
UV resistance	Good, no changes during 24 month exposure
Long-term durability	Good, no changes during 6 month dynamic testing (~1.50E+09 cycles)

Dynamical properties

Glass transition temperature Tg at 1 Hz ; 10 Hz ; 100 Hz	6°C ; 14°C ; 22°C
Material properties (at Tg and 1 Hz)	
Storage modulus E' (strain) (Complex Young's modulus $E^* = E'(1 + i\eta)$)	9.2 MPa
Storage modulus G' (shear) (Complex shear modulus $G^* = G'(1 + i\eta)$)	2.1 MPa
Damping coefficient η (at Tg and 1 Hz)	1.0

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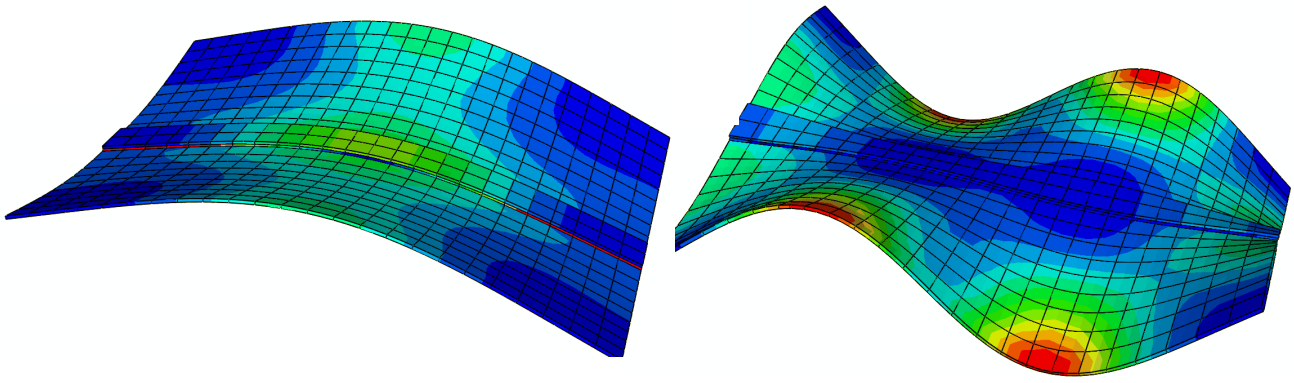
Constrained-layer damping (CLD)

Most CLD applications use a three-layer "sandwich" system that is formed by laminating the vibrating base layer with a damping layer and then adding a third, constraining layer. When the system flexes during vibration, the alternating shear strain in the damping material causes the vibration to dissipate as frictional heat. In comparison to the free-layer damping technique, Noisetek ELASTE systems perform better as the substrate thickness increases. Additionally, in weight-sensitive applications, these Noisetek ELASTE systems allow for lighter overall constructions than do equivalent free-layer systems.

Modeling – FEM Material Model

Temperature- and frequency-dependent physical properties of high damping epoxies were measured via dynamic-mechanical thermal analysis (DMTA). From these measurements, a visco-elastic model was developed for describing frequency- and temperature- dependent properties. With this material model, FE modeling tools can be used to assess the effect of various damping treatments on the response of real-world structures to vibration.



Picture 1. *Finite element modelling examples: The material model of Noisetek ELASTE is used in this sandwich structures. Vibration damping material is located under the thin constraining-layer strip. On the left side the damper is located at the center of the plate and in a right way to damp the certain vibration mode. The highest strain energy and deformation is located at the Noisetek ELASTE damping layer (color code red). On the right side you can see a vibration mode of the plate that is not effected by the damper in the middle.*

Please contact our experts for proper usage and for more information.

We will gladly help you with completing your projects and provide Noisetek ELASTE material and dampers to solve any vibration challenges that you may face.

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