Layered Viscoelastic Damping Polymer

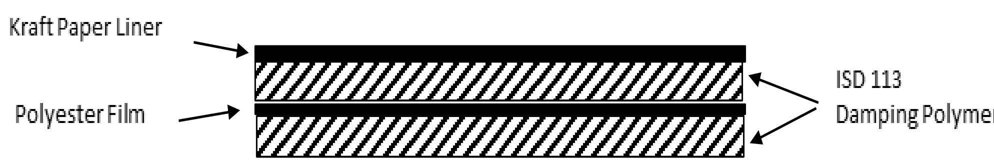
SJ-2040X

Technical Data March 2017

Product Description

3M™ Layered Viscoelastic Damping Polymer SJ-2040X is a high energy dissipative viscoelastic polymer which, when properly incorporated into a constrained layer damping system, can afford excellent control of resonance induced vibration. The polymer SJ-2040X consists of two layers of ISD 113 viscoelastic polymer material with a polyester film interleaf to afford dimensional stability during application. The adhesion characteristics of both surfaces of this material allow application to many substrates without the use of additional bonding mediums. Polymer SJ-2040X is available in roll form or fabricated into custom die-cut shapes. Since 3M™ Layered Viscoelastic Damping Polymer SJ-2040X is a combination of polymer layers and film, its exact dynamic performance cannot be described until a constraining layer of a given dimension is added. The dynamic performance, however of ISD 113 viscoelastic damping polymer is well characterized and dynamic properties for this viscoelastic polymer are shown on the next page.

Product Construction And Typical Physical Data



Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Viscoelastic Polymer Density:	0.035 lb./in.^{3} (0.98 m/cm^3)
Total Tape Thickness: (No Liners)	0.0215 in. (0.546 mm)
ISD 113 Damping Polymer Thickness: (Each Layer)	10 mils (0.254 mm)
Polyester Film Layer Thickness:	1.4 mils (0.036 mm)
Viscoelastic Weight:	0.106 lb./ft.^{2} (48.2 g/ft.^{2})

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Typical Damping Properties

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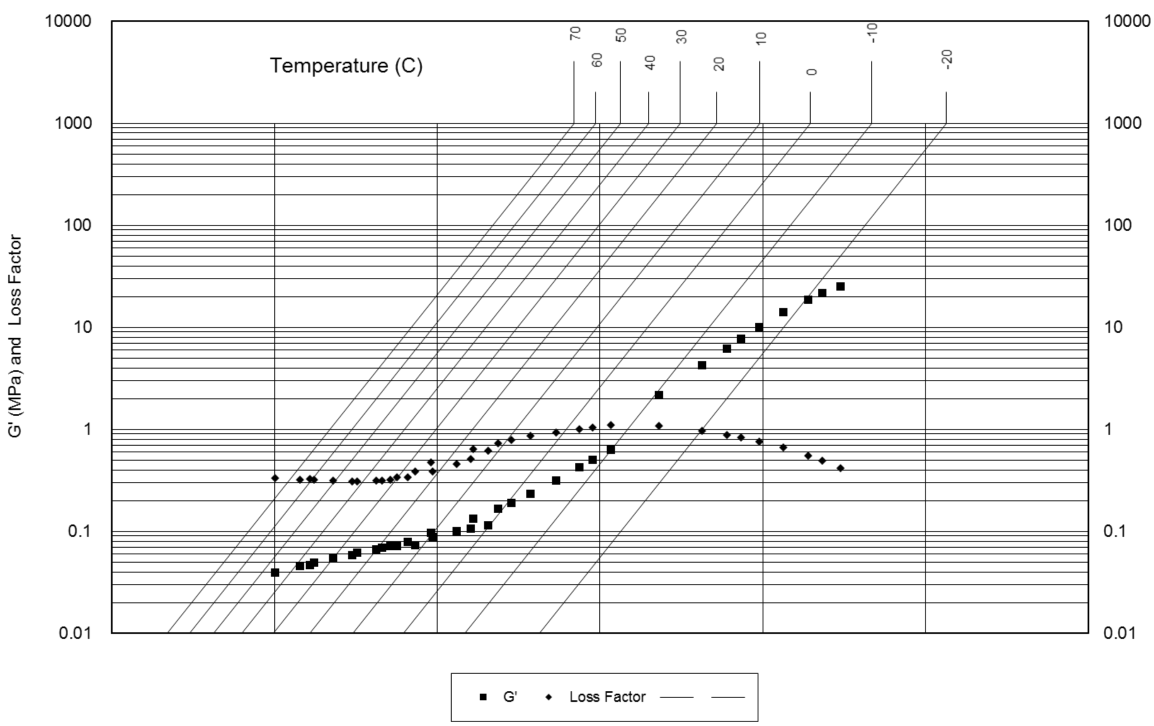
The loss factor and shear (storage) modulus of a material are two dynamic properties that can define its damping performance. These two parameters identify a material's ability to convert vibratory energy to heat energy. The curves show the performance of ISD 113 Damping Polymer plotted against temperature and frequency in the form of a reduced temperature nomograph, illustrating both the high performance and the temperature dependent qualities of the damping system.

The performance of most damping materials is highly dependent on the interaction between the damper and the substrate to which it is applied. In addition to temperature and frequency, the geometry, stiffness, mass and resonance mode shape of the structure to which the control system is applied will affect the performance of the damping treatment.

ISD 113 Nomograph



Test Method: These properties were determined isothermally at each temperature on a Polymer Laboratories Dynamic Mechanical Thermal Analyzer (DMTA). The strain amplitude used 89.47% peak to peak. Measurements were done at frequencies of 0.3, 1.0, 3.0, 10 and 30 Hz. Data at non-test frequencies and temperatures were determined from time-temperature superposition principles.

IMPORTANT:
The oblique constant temperature lines are separated by non-uniform spacings. Hence a linear extrapolation of a temperature not explicitly shown cannot be used to obtain other temperature data.

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To determine the damping properties at the desired temperature and frequency from the above data graph, proceed as follows:

1. Locate the desired frequency on the RIGHT vertical scale.
2. Follow the chosen frequency line to the desired temperature isotherm.
3. From this intersect, go vertically up and/or down to intersect the shear (storage) modulus and loss factor curves.
4. From this intersect, follow horizontally to the LEFT vertical scale and read the shear (storage) modulus and loss factor values from the appropriate left vertical scale.

Characteristics

- Excellent aging qualities of the viscoelastic polymer provide long term performance.
- Wide temperature range for damping. Usable from -45° to 38°C (-50° to 100°F) at 100 Hz.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

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