Constrained Layer Damping Material

Reduction of vibration in circuit boards and panel-type structures using a highly damped, constrained viscoelastic material

Attributes
The EPSG CLDM material effectively and efficiently reduces the amount of vibration transmitted to a structure resulting in longer fatigue life of the structure or circuit board components. Typically, undamped structures have resonant transmissibilities of 30:1 to 50:1 compared to the input. Damped systems have transmissibilities of 3:1 to 10:1. This significant decrease in transmissibility directly correlates to a reduction in sound power transmission from the structure at resonance. Circuit boards can be ruggedized efficiently and cost effectively without changes to the components of the circuit board.

Applications
The CLDM damping material has three layers: a viscoelastic damping material, a polyester constraining layer, and a protective release paper. The CLDM material is designed to offer the maximum amount of structural damping to circuit boards and panel structures by shearing the highly damped viscoelastic layer.

Material Properties
Temperature range------- -60F to 200F
Thermal Conductivity----- 1.712 BTU-IN/HR/FT^2/F
Tensile Strength---------- 52 PSI
Adhesive Peel Strength---- 122 OZ/IN after 5 MIN
                      156 OZ/IN after 24 HR
Breakdown Voltage------- 45 KVAC
Specific Gravity ------- 1.234 Grams/CM^3
Dielectric Strength----- 490 Volts/MM
Shear Strength---------- 45PSI
Fungus Resistance------ No Growth
Shelf Life----One Year from Date of Manufacture

Installation Data
To install the CLDM material, simply remove the protective release paper and place the damping material on the undamped structure. In circuit board application, the CLDM material must cover at least 60% of the back of the circuit board. Hand pressure is all that is required to adhere the CLDM damper. No additional pressure or curing is needed. The CLDM material is flexible enough to adhere to slightly imperfect surfaces.

Dimensions
The CLDM material is available in sheets of different sizes and shapes as well as different constraining layer materials polyester, stainless steel, aluminum, galvanized steel as well other unique materials. The thickness of the constraining and viscoelastic layers can be varied depending on the application’s requirements. The data below is based on a .020 inch thick polyester layer and a .060 inch thick viscoelastic layer. We have found that this configuration provides optimal damping of circuit boards and undamped structures.

Input
A Sine sweep of 2G’s at 30 to 500 HZ
Constrained Layer Damping Material

VIBRATION CHARACTERISTICS

RANDOM INPUT
INCREASED STIFFNESS 27%
DECREASE IN TRANSMISSIBILITY 59%

SINUSOIDAL INPUT
INCREASED STIFFNESS 11%
DECREASE IN TRANSMISSIBILITY 60%

OUTGASSING CHARACTERISTICS

MATERIAL OUTGASSING
TOTAL MASS LOSS 3.23%
CVCM .52%

FLAMMABILITY CHARACTERISTICS

FLAMMABILITY RESISTANCE FAR 25.853 B-2, B-3

CLDM TRANSMISSIBILITY DATA

![Graph showing transmissibility data over frequency, comparing undamped and damped responses.](image-url)
Damping Material EPSG 7361D

Reduction of vibration in panel-type structures using a highly damped, constrained viscoelastic material

Attributes

The EPSG 7361D material effectively and efficiently reduces the amount of vibration transmitted to a structure resulting in longer fatigue life of the structure or components. Typically, undamped structures have resonant transmissibility's of 30:1 to 50:1 compared to the input. Damped systems have transmissibility's of 3:1 to 10:1. This significant decrease in transmissibility directly correlates to a reduction in sound power transmission from the structure at resonance. 7361D has an aggressive surface tack and high tensile strength that provides an immediate bond while remaining flexible.

Applications

The 7361D damping material is produced as constrained layer or non constrained layer depending on the application. The constrained version is a viscoelastic damping material, a constraining layer, and a protective release paper. The 7361D material is designed to offer the maximum amount of structural damping to panel structures by shearing the highly damped viscoelastic layer between the two constrained layers.

Material Properties

Hardness (Shore 00) ————– 60-80
Color ————– Black
Temperature range ————– 25F to 180F
Thermal Conductivity ————– 1.972 BTU-IN/HR/FT^2/F
Breakdown Voltage ————– 60 KVAC
Specific Gravity (ASTM D792) ————– 1.40 Grams/CM^3
Dielectric Strength ————– 490 Volts/MM
Tensile Strength (ASTM C907) ————– 10-18 PSI
Elongation at Break (ASTM C908) ————– 300%
Lap Shear Strength (ASTM C961) ————– 6 PLI Min
Adhesive Peel Strength ————– 49 OZ/IN after 5
———– 73 OZ/IN after 24 HR
Fungus Resistance ————– No Growth

Installation Data

To install the 7361D material, simply remove the protective release paper and place the damping material on the un-damped structure. The 7361D material must cover at least 80% of the back of the structure. Hand pressure is all that is required to adhere the 7361D damper. No additional pressure or curing is needed. The 7361D material is flexible enough to adhere to imperfect surfaces no primer is required.

Dimensions

The 7361D material is available in sheets of different sizes and shapes as well as different constraining layer materials polyester, stainless steel, aluminum, galvanized steel as well other unique materials. The thickness of the constraining and viscoelastic layers can be varied depending on the application’s requirements. The data below is based on a .005 inch thick aluminum layer and a .039 inch thick viscoelastic layer. We have found that this configuration provides optimal damping of un-damped structures.
Damping Material EPSG 7361D

Composite Loss Factor of EPSG 7361D at 30, 60 and 71 C from Oberst Bar Damping Tests

Sample Description: .005 aluminum with 1 MM 7361D
Measured Sample Thickness 1.3 MM
Measured Sample Surface Weight 1.7 kg/m²
Steel Bar – Free length 200 mm, Thickness 0.8 mm, Width 12.7 mm

Dynamic Mechanical Thermal Analysis Test

\[ T \text{ and } M \text{ curves at different temperatures.} \]