

# Constrained Layer Damping

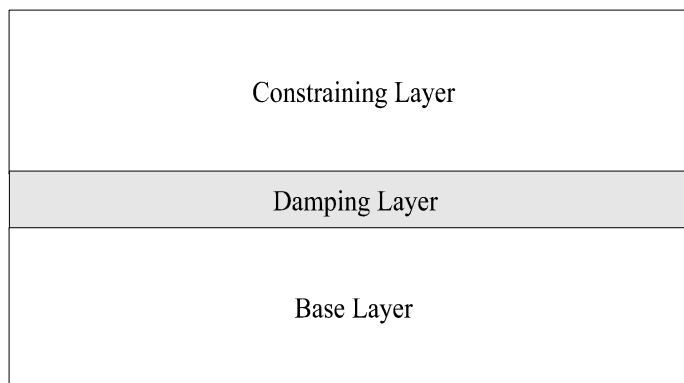
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This paper will cover two kinds of damping methods, extensional (also known as free-layer) and constrained layer damping.

Briefly, extensional damping simply requires that a damping material be applied to the base material. This type of damping is widely used in the automobile industry to lower road noise and to control vibration in door and body panels. While extensional damping does have applications within the audio world (damping of metallic chassis, etc.), we have found that a much more effective form of damping resonances in high end audio playback systems is constrained layer damping.

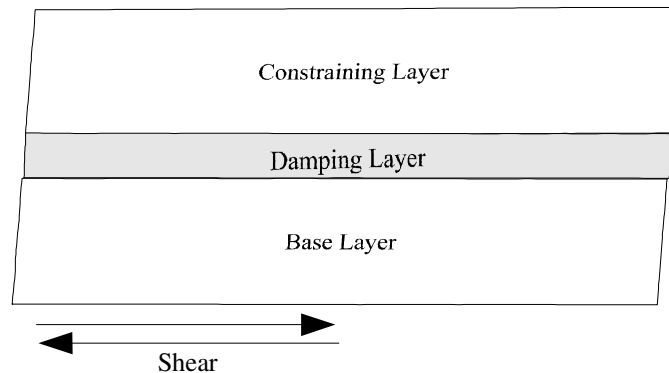
For the purposes of this paper, we will discuss constrained layer damping as utilized by Locus Design in our record weights and damping feet.

Constrained layer damping typically is a three-layer sandwich system that is comprised of a base layer laminated to a damping layer, to which is then added a third layer, hence the term “sandwich”. We have implemented constrained layer damping principles, by using two precision CNC milled aluminum layers separated by a carefully selected viscoelastic compound. Reference the below cross section:



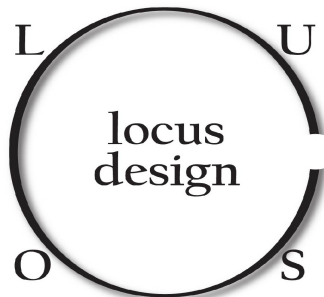
Constrained Layer Construction (cross section).

In this sandwiched arrangement, the record weight flexes when encountering vibration and the damping layer is forced to change shape that shears the adjacent material sections. This shearing in the damping material dissipates the vibration as low grade frictional heat. See the below for a simplified representation of the damping system under vibration.



Constrained layer damping is a complex system with many variables that need to be taken into consideration for the maximum reduction of vibration. The durometer of the viscoelastic compound, including the thickness of the compound and the dimensions of the constraining layers.

Locus Design has worked for many years to design and engineer, what we feel, is the finest implementation of constrained layer damping products available to the high end audio market today.



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