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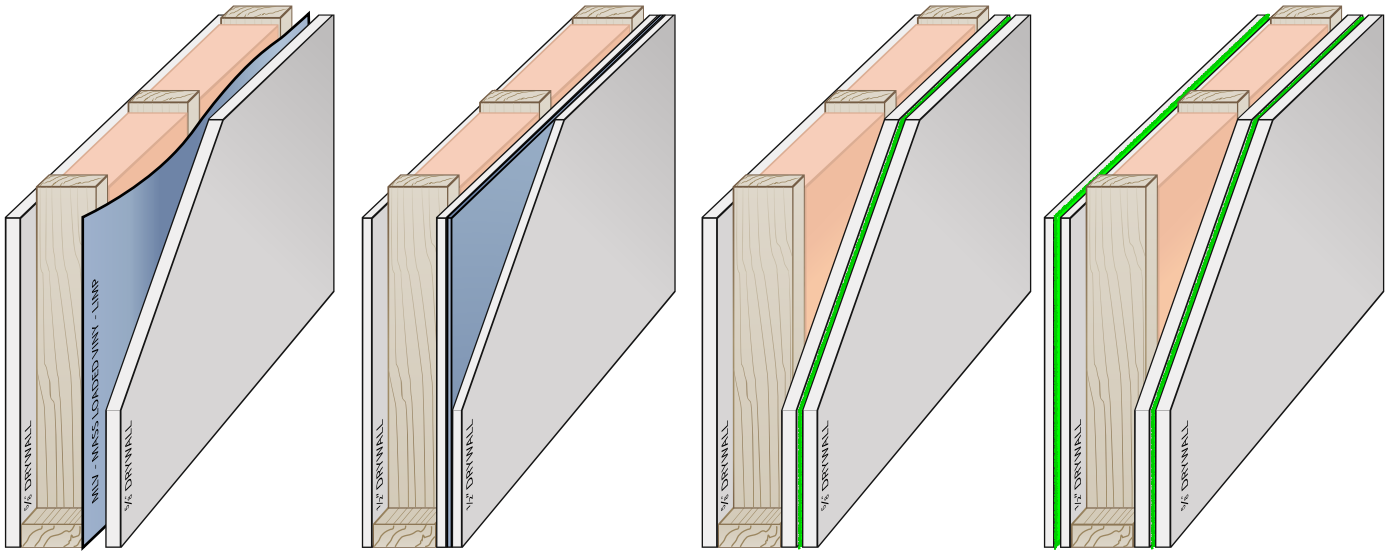
Green Glue (GG) –vs.– Mass Loaded Vinyl (MLV)

Green Glue Company is pleased to present data for Green Glue (a viscoelastic damping material),and mass-loaded vinyl, commonly known as MLV (a limp-mass sound barrier). The data was collected at Orfield Laboratories, an independent NVLAP accredited lab in Minneapolis, MN, in 2005, and compares Green Glue to two different common applications of MLV. In one case the MLV is hung limply, in another case it is sandwiched between drywall layers.

Test Description:

To address this question, Green Glue Company ran a series of tests at Orfield Laboratories, a NVLAP certified independent lab in Minneapolis, MN. Below are the wall configurations, from source room to receive room. All details of the walls were identical, including insulation, screw length and spacing, stud configurations, and so forth.

Wall configurations, from source room to receive room:

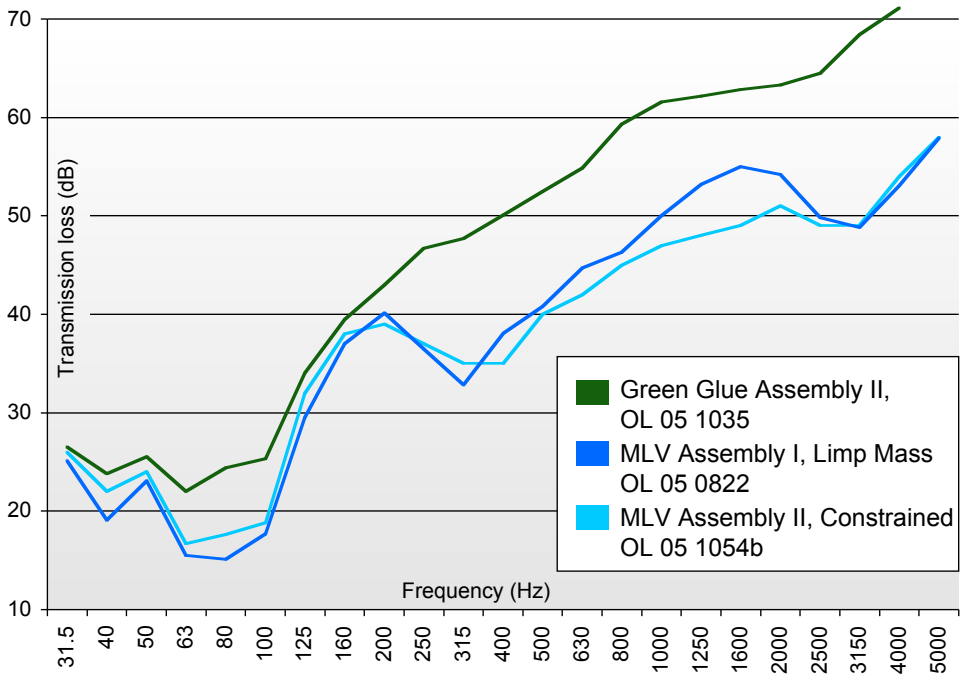


MLV Assembly I Limp Mass Test	**MLV Assembly II** Contrained Test	**GG assembly I** 1 Layer on Source Side	**GG assembly II** 1 Layers on Both Sides
5/8" drywall + MLV (1 lb per square foot, limply hung)	1/2" drywall+ MLV (1lb per square foot, bonded with carpet adhesive) + 1/2" drywall	5/8" drywall + Green Glue @ 58 fluid ounces per 4' x 8' sheet + 5/8" drywall	5/8" drywall + Green Glue @ 58 fluid ounces per 4' x 8' sheet + 5/8" drywall
2x4 single wood studs, 24" on center	2x4 single wood studs, 24" on center	2x4 single wood studs, 24" on center	2x4 single wood studs, 24" on center
R8 fiberglass insulation*	R13 fiberglass insulation	R13 fiberglass insulation	R13 fiberglass insulation
5/8" drywall	1/2" drywall	1/2" drywall	1/2" drywall + Green Glue @ 58 fluid ounces per 4' x 8' sheet+ 1/2" drywall
OL 05-0822	OL 05-1054	OL 05-0416	OL 05-1035

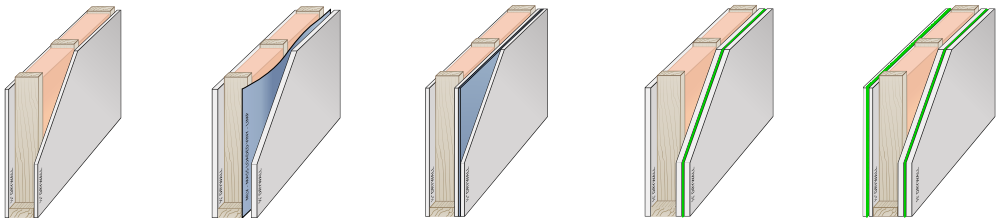
* - Sellers of Mass Loaded Vinyl recommended slightly thinner insulation to avoid interfering with the limpness of the MLV

Official lab reports are available, report numbers given in the accompanying graph.
Additionally, Green Glue on just one side of the wall was tested.

Chart 1 - Effects of Green Glue



Of particular interest is the exceptional improvement around the resonance points of the wall. At the primary low frequency resonance (around 80hz or so), the Green Glue wall outperforms the MLV assemblies by as much as 9dB – the equivalent of tripling the mass of the wall. Over most of the vocal/speech frequency range, the Green Glue assembly outperforms the MLV assemblies by 10-15 dB. While the performance of the limp mass material is not poor, Green Glue – a damping material – notably outperforms. Official lab reports are available. The relevant reports are listed on the graph to the left.



	Reference 5/8" on both sides	MLV Assembly I Limp Mass Test	MLV Assembly II Limp Mass Test	GG Assembly I 1 Layer on source side	GG Assembly II 1 Layers both sides
STC	40	45	44	52	56
OITC	29	31	33	36	40
Flat Noise Reduction, dBA [a]	38	42	42	47	50.4
Theater Reduction [b]	-	42	42	48	53
Assembly weight (lbs/sq ft)		6.2 lbs/sq ft	7.4 lbs/sq ft	7.7 lbs/sq ft	9.2 lbs/sq ft

[A] An assessment of wall performance that is not an official standard, but is utilized by Green Glue Company as a superior method to STC□
standard, and using a bandwidth of 31.5-5000hz. Equal Loudness attempts to correlate to how people actually hear.
[B] The A-weighted sound reduction for a noise source having flat response from 31.5 to 5000hz. For additional information about how these ratings are calculated, and for spreadsheets that will allow you to calculate them,
visit our website at www.audioalloy.com

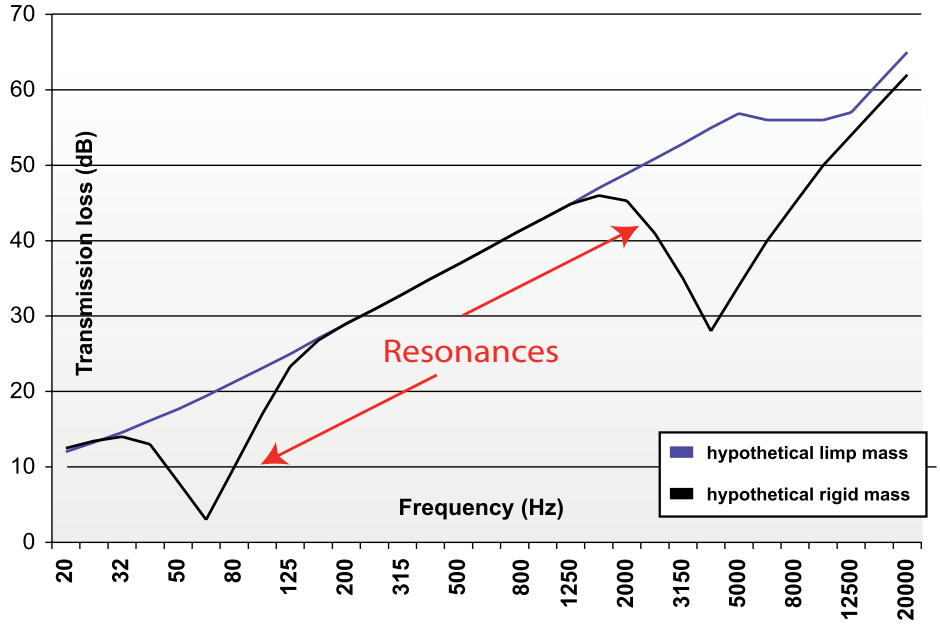
Summary Green Glue outperforms MLV. The discrepancy is even more notable when you consider cost/performance. The low cost of Green Glue plus the fact that a sheet of drywall weighs far more than the same area of MLV allows the GG assemblies to be heavier, widening the performance gap.

Appendix – Discussion of Damping, Limp Mass, and How They Operate

Limp mass has long been considered, in a way, the "holy grail" of sound isolation. A quick look at the properties of a limp mass material -vs- the properties of a rigid material such as common drywall show us why.

Limp materials have three enormous advantages. First, their flexibility causes resonance problems to be so low or so high in frequency that they don't matter. Second, ideally a limp mass material would be well damped, which would make the resonances much less severe. And last but not least, the combination of flexibility and damping would make a material that didn't conduct vibration very well at all. So whatever vibration gets into the limp mass is quickly dissipated.

Chart 2 - Limp -vs- Rigid Mass



This graph may help illustrate these advantages:

When a partition has no air cavity, its performance can never be better than the potential defined by its weight. A limp mass will reach the full potential of its weight. A rigid mass, on the other hand, will exhibit resonance problems that make its performance much lower. On a partition such as the common wood-stud wall, the benefits of limp mass would be even higher.

So how could Green Glue outperform a limp mass product? Well the reason is that simply putting limp mass into an assembly cannot make the entire assembly limp. MLV cannot make drywall less rigid, and it cannot cause the drywall to not conduct vibration, and it cannot damp the resonances in the drywall as it's hardly in contact with the drywall at all. The wall remains stiff and prone to resonance, but with added weight of the limp mass material and some other benefits.

Similarly, adding Green Glue to a wall doesn't make the wall limp either. Green Glue can't make drywall or studs less rigid, but the damping behavior of Green Glue can greatly impair the ability of the drywall to conduct vibration – one of the marvelous properties of a limp mass. And the damping behavior of Green Glue can notably reduce the resonant behavior of the drywall – the second of the great attributes of limp mass materials. Thus, it could reasonably be said that Green Glue goes much farther towards reaching that holy grail of "limp mass" than does the addition of something floppy into a wall cavity.

The MLV assembly in which MLV was used as a sandwich damping material didn't meet the performance of Green Glue for the simple reason that MLV is not nearly as effective of a damping material as Green Glue.