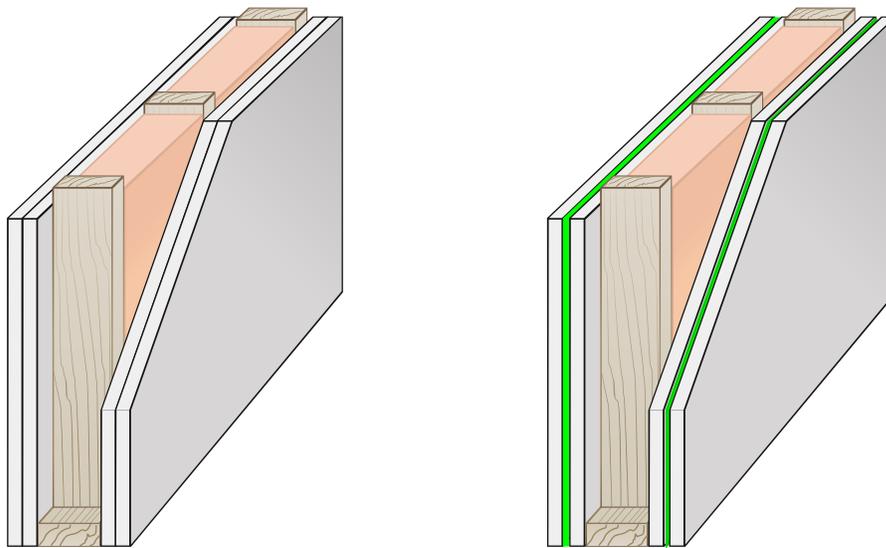


Green Glue (GG) –vs– Extra Drywall

One of the most frequent and rational questions about Green Glue is this: “Sure, Green Glue performs well, but does it really outperform just adding more layers of drywall?” We will answer that question herein.

Part 1 – Comparison test details:

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.

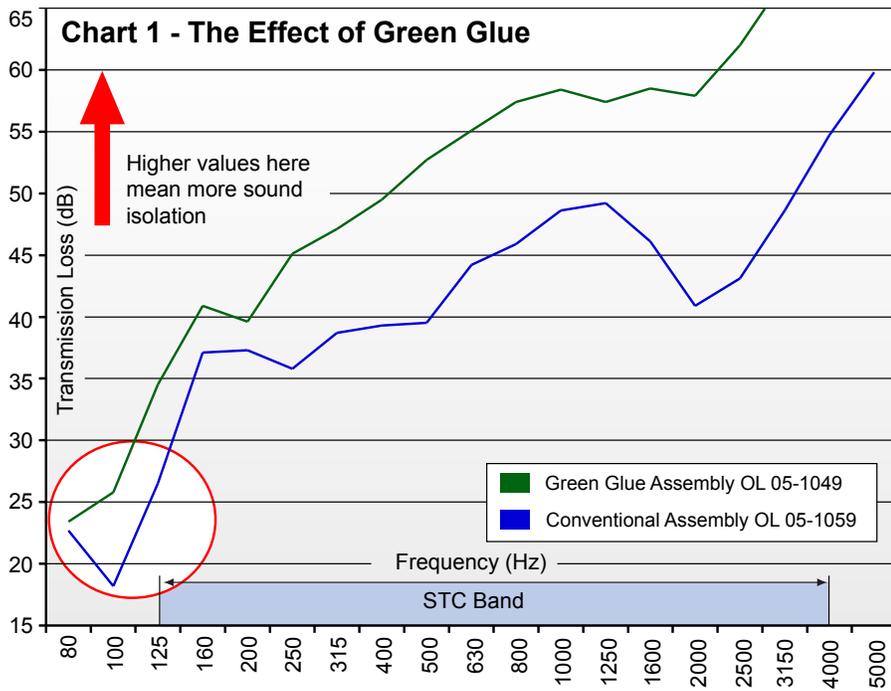


	Conventional Assembly II	Green Glue Assembly II
Source Side:	Double 5/8" drywall	Double 5/8" drywall with recommended application of Green Glue
Wall Framing:	2x4 single wood studs, 24" on center	2x4 single wood studs, 24" on center
Insulation:	R13 fiberglass insulation	R13 fiberglass insulation
Receiving Wall:	Double 5/8" drywall	Double 5/8" drywall with recommended application of Green Glue
Test Number:	<u>OL 05-1059</u>	<u>OL 05-1049</u>

Wall configurations, from source room to receive room:
Official lab reports are available; the applicable test numbers are given in the chart below.

Part 2 – The Effect of Green Glue:

By testing an identical wall configuration with and without Green Glue it is possible to divine the effect of Green Glue on this type of wall.



This graph illustrates the effect of Green Glue as demonstrated by the above tests. It must be noted that the Green Glue wall may have been limited by flanking noise in the laboratory over much of the frequency range. The important point of this flanking discussion is that the real benefit of Green Glue may be even larger over much of the frequency range if flanking noise was not present. In real world situations, the level of flanking noise may also affect results.

The difference is impressive. Unlike resilient decoupling methods that cause performance to suffer at some part of the low frequency range, Green Glue has a sizeable positive effect at low frequencies.

Wall Setup	STC	OITC	Full band flat noise reduction, dBA ^A	Theater noise equal loudness reduction ^B	Assembly weight (lbs/sq ft)	
Conventional	44	33	42	43	10.4	
Green Glue	55	39	50	53	9.95	

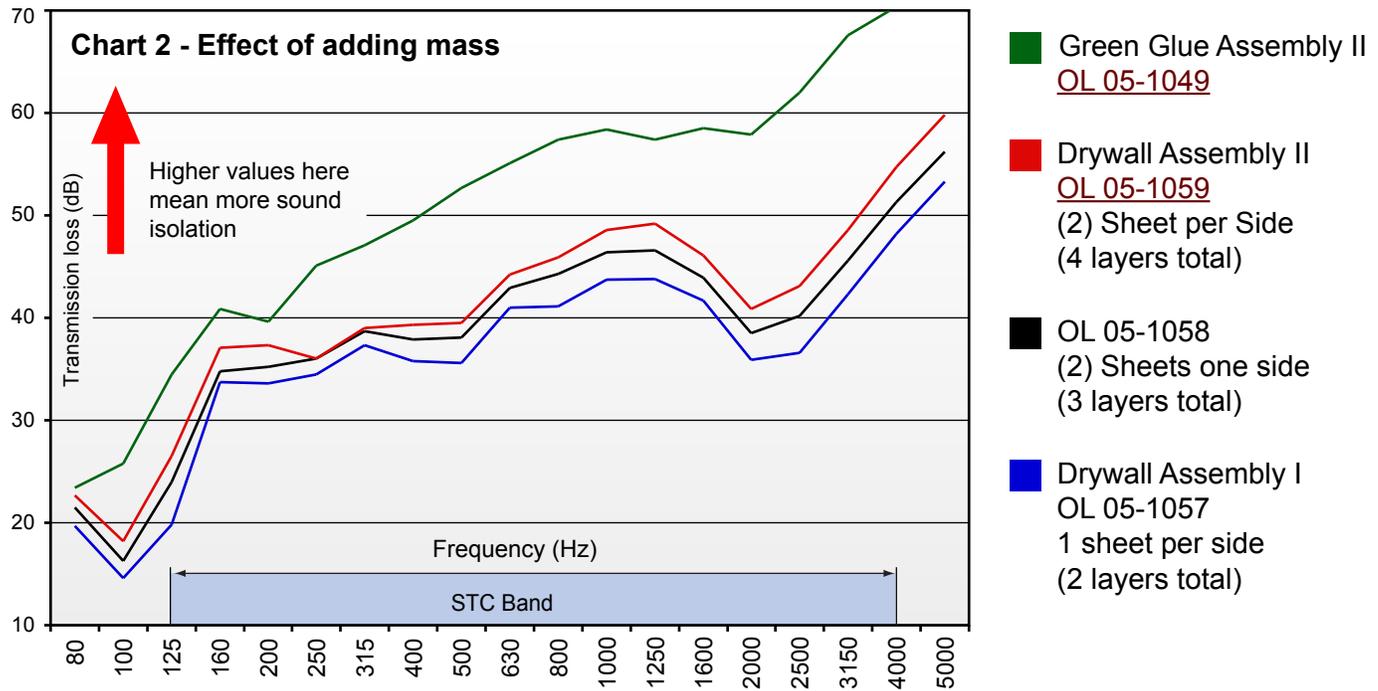
^A An assessment of wall performance that is not an official standard, but is utilized by Green Glue Company as a superior method to STC or OITC for music and theater applications where low-frequency content is high. It calculates using the ISO 226 equal loudness standard, and using a bandwidth of 31.5-5000Hz. 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.greengluecompany.com

^C Detailed discussion in appendix 1.

Simply adding more mass would not close the performance gap economically, as will be more thoroughly discussed in the next section. It is important to note that the conventional wall was heavier than the Green Glue wall. This is due to heavier drywall (drywall varies a bit from board to board).

Part 3 – The Effect of Just Adding Mass.



Effect of adding mass is only incremental. Note how the red and black lines are only slightly higher than the lighter blue wall? This is because the effect of simply adding mass to the common wall is only incremental. Based on a survey of historical data (NRC Canada, IR761 and IR818, USG/RAL data circa 1983, Owens Corning data circa 1972), doubling the number of layers results in about 4-5 dB of overall improvement. In this case, the net improvement was about 4dB regardless of what calculation was used to assess performance.

It is the ratio of mass that is important. Another important thing to remember about adding mass to the common wall is that it is the ratio of the increase in mass that matters. To get as much improvement as you did from going from 1 layer on each side of the wall to 2 layers (doubling the mass), you would have to again double the mass – to 4 layers per side.

So, you see, simply adding mass to the common single-wood-stud wall does not have an enormous effect. Adding mass + damping in the form of Green Glue, however, has a great effect.

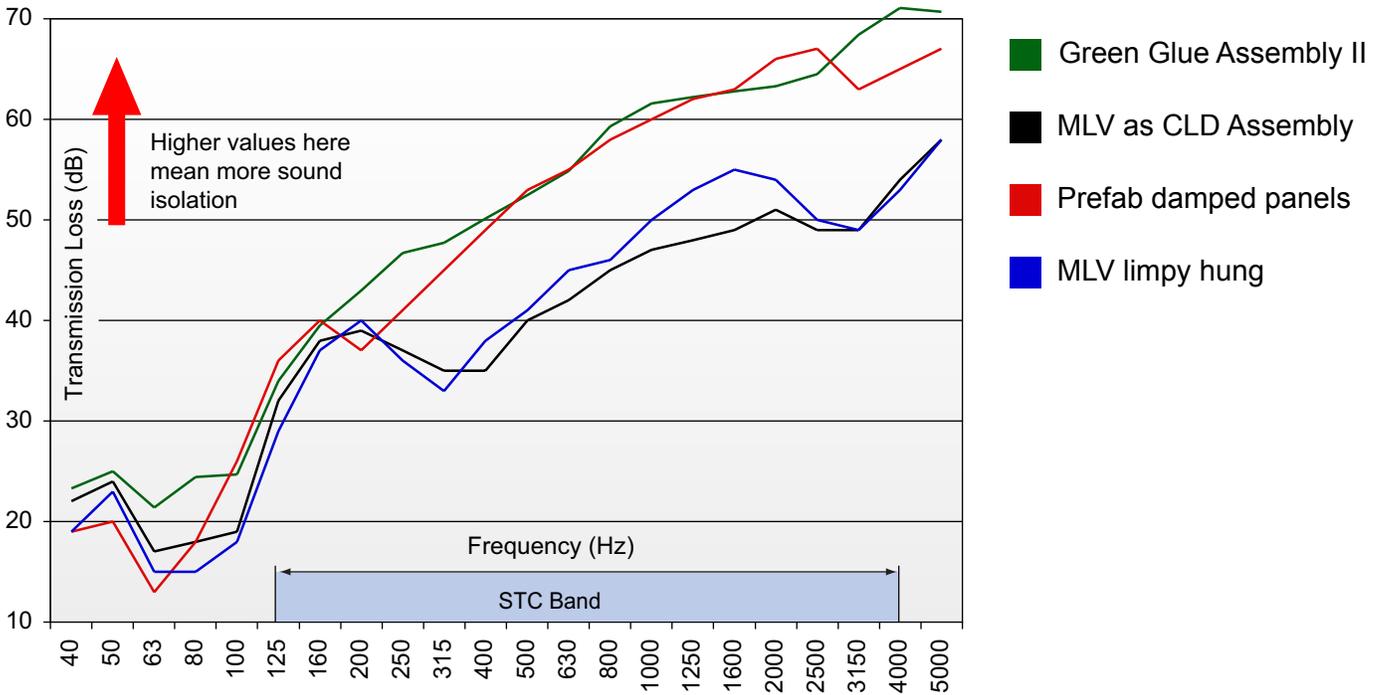
Part 4 – Green Glue and other commercial products

Other products, such as Mass Loaded Vinyl (MLV) or pre-fabricated damped panels are often utilized for sound isolation applications. This chart outlines the performance and cost of a Green Glue wall compared to these other options. The assemblies were as follows:

Green Glue:	Green Glue used on both sides of a wall with 5/8" and 1/2" drywall
MLV limply hung:	5/8" drywall was used on one side, 1/2" on the other, with MLV limply hung under the source room side
MLV as constrained layer damping:	1/2" drywall was used on the receive room side, and double 1/2" drywall sandwiching MLV was used on the source room side. So, 3 layers of 1/2" drywall + MLV
Prefab damped panels:	Pre-damped panels were utilized on both sides

All the assemblies featured the same stud and insulation configuration as above.

Chart 3 – Green Glue against other commercial products



Wall	STC	OITC	Full band flat noise reduction, dBA*	Theater noise equal loudness reduction**
MLV, limply hung	45	31	42	42
MLV sandwich assembly	44	33	42	42
Prefabricated damped panels both sides	54	33	46	46
Green Glue on one side of the wall	52	36	47	48
Green Glue on both sides of the wall (shown in graph)	56	39	51	53

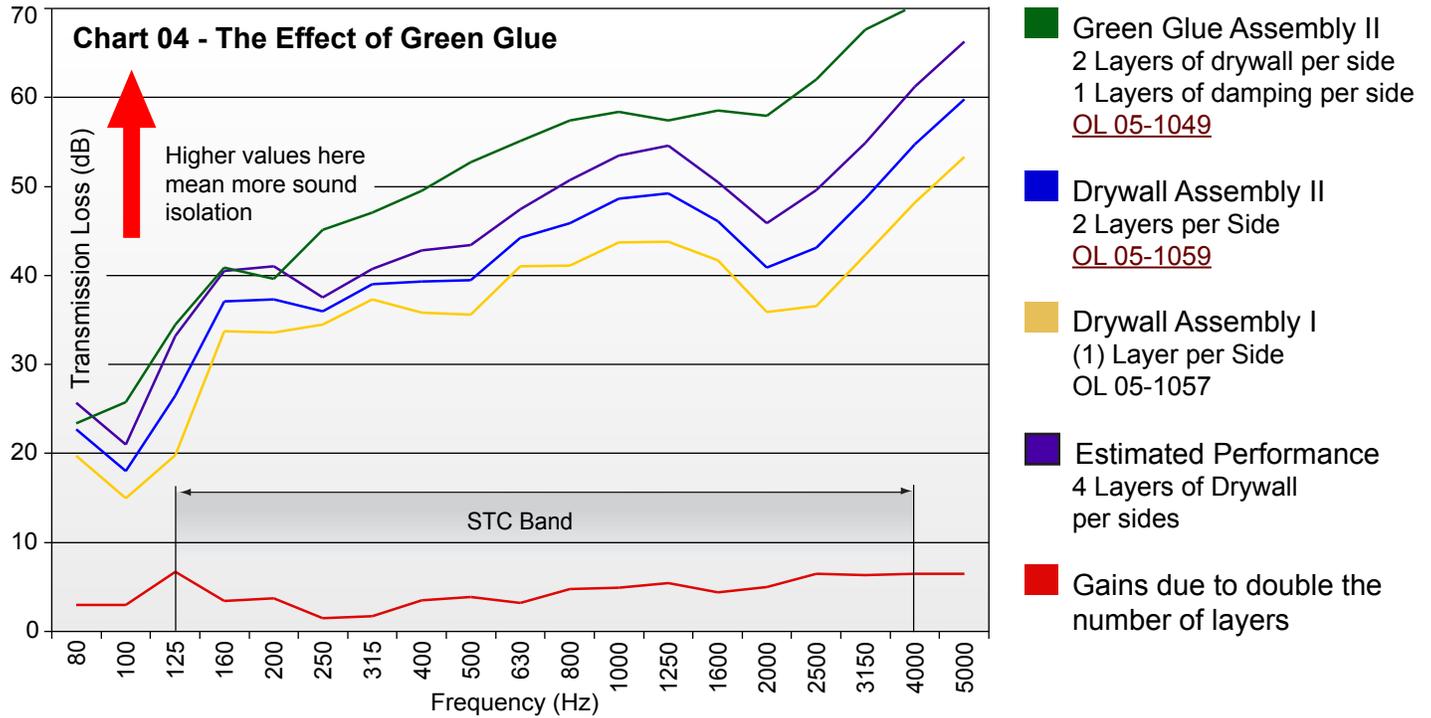
Green Glue easily outperforms these other products, both in absolute performance and in cost/performance. The prefab damped panels easily outperform the limp mass materials in most calculations as well. Green Glue is certainly not the only quality sound isolation product, but it is a very good one, and among the most economical options available.

Summary:

The performance and cost effectiveness of Green Glue on the common wood stud wall are evident. It is worth mentioning that we are not aware of any other commercial product which has been so directly compared to conventional walls and other products in the same lab. If you are wondering how Green Glue compares to other products, we have a variety of such information available on the web site.

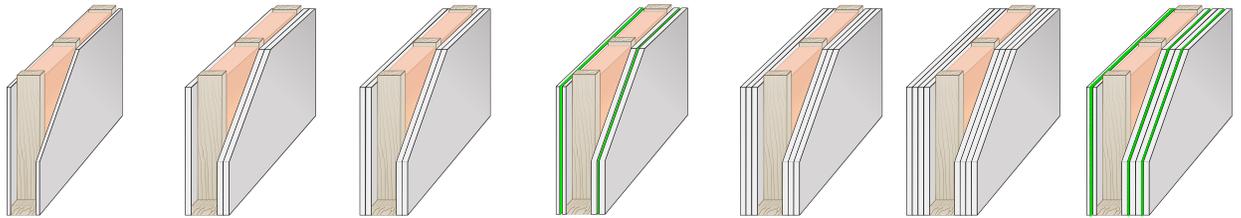
Appendix 1 - Estimating performance of even heavier walls.

The test series was stopped at 2 layers of drywall per side. However, we can estimate the performance of a wall with 4 layers of 5/8" (16mm) drywall on each side by adding the gains that were observed when moving from one layer of drywall per side to 2 layers per side. Add the gains that resulted from doubling the mass, and a very good estimate of the performance of a wall with 4 layers of drywall per side can be attained.



Wall Assembly performance

Working from this type of estimation, we offer the following table of performance.



Assembly Description	1 layer of drywall each side	2 layers of drywall + 1 layer of drywall	2 layers of drywall on both sides	2 layers of drywall both sides + 1 layer of GG per side	3 layers of drywall on both sides	4 layers of drywall on both sides	6 total layers of drywall + 3 total layers of GG
STC	40	42	44	55	46	48	57**
OITC*	29	31	33	39	35	37	43**
Flat noise (see above)	38	40	42	50	44	46	53**
Theater Reduction	38	41	43	53	46	48	57**
Test Number	OL 05-1057	OL 05-1058	OL 5-1059	OL 05-1049	Estimate	Estimate	Estimate

* - A detailed discussion of the curves utilized for these calculations is found in the appendix

** - This wall was considerably flanking limited, see above and the test report for details.

Even doubling the number of conventional layers (relative to a Green Glue wall) will not match the performance of a Green Glue assembly on the common wall.