

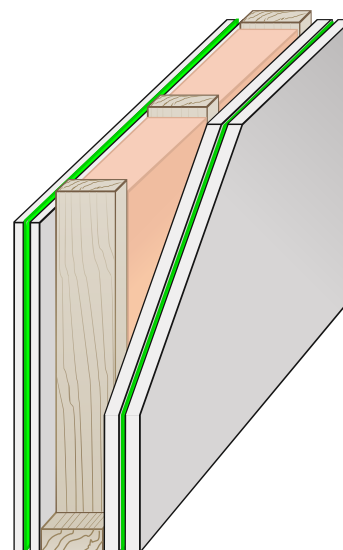
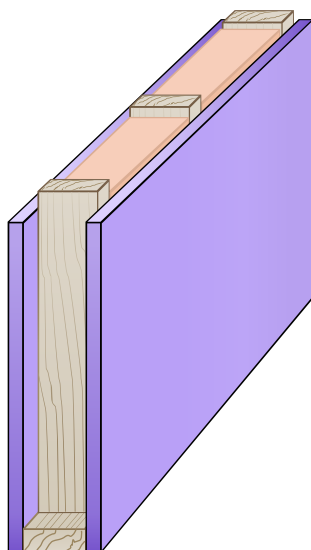
Green Glue (GG) –vs– Factory Damped Panels (FDP)

The Green Glue Company is pleased to present 3rd party, same-lab data for Green Glue (a viscoelastic damping material) and one of the better-known drywall products available today that features factory applied viscoelastic damping material. The data was collected at Orfield Laboratories, an independent NVLAP accredited lab in Minneapolis, MN, in May and August of 2005.

Part 1 – Test Description:

To compare Green Glue and factory damped panels, both of which are based on the principle of viscoelastic damping, we selected a common wall configuration in line with configurations typically tested by acoustic product manufacturers.

Typically in real construction screw spacing would be 12” on center for this wall type. Tests were conducted at 16” on center to comply with our competitors’ test practices. For data on a Green Glue wall with screws at the more appropriate 12” spacing, see the appendix of this document.



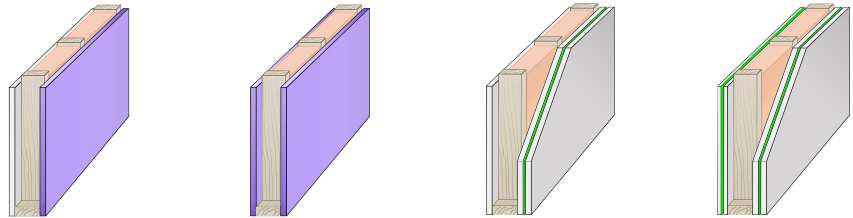
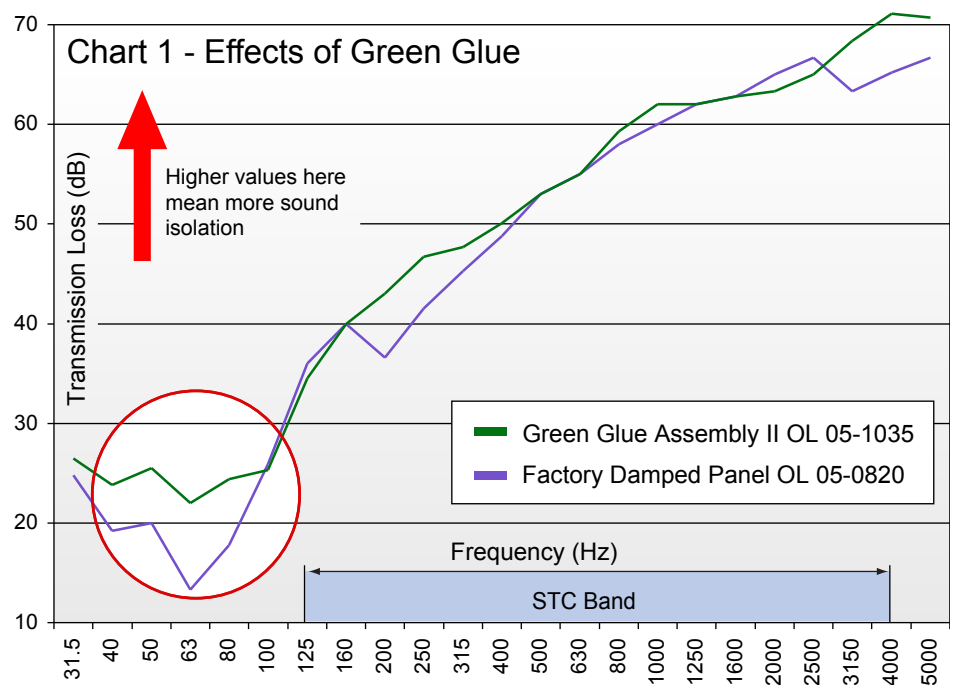
	Factory Damped Panel Assembly	Green Glue Assembly II
Source Side:	5/8” factory-damped drywall	1/2” drywall + Green Glue @ 58 fluid ounces per 4’ x 8’ sheet + 1/2” drywall
Wall Framing:	2x4 single wood studs, 24” on center	2x4 single wood studs, 24” on center
Insulation:	R13 fiberglass insulation	R13 fiberglass insulation
Receiving Wall:	5/8” factory-damped drywall	5/8” drywall + Green Glue @ 58 fluid ounces per 4’ x 8’ sheet + 5/8” drywall
Test Number:	OL 05-0820	OL 05-1035

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

The performance of the factory-damped drywall is indeed very good, matching or approaching the performance of the Green Glue assembly over much of the frequency range.

The superior damping of Green Glue, however, combined with the fact that two layers of conventional drywall are heavier than one layer of thin factory damped drywall, result in the Green Glue assembly offering significantly superior performance in the critical low frequency region and superior scores in all measures of performance.

Official lab reports are available. The relevant reports are listed on the graph to the left.



Summary of Performance	Factory-Damped Panel Only on one side	Factory Damped Panel Assembly on both sides	Green Glue Assembly I 1 Layer on source side	Green Glue Assembly II 2 Layers both sides
STC	51	54	52	56
OITC	32	33	36	39
Flat Noise Reduction, dBA ^a	44	46	47	51
Theater Reduction ^b	44	46	48	53
Assembly Weight (lbs/sq ft)	6.1 lbs/sq ft	6.7 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 The 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 www.greengluecompany.com

^c Based on \$3.25/sq foot selling price of predamped sheet. Subtracts cost of drywall that predamped sheet replaces. For Green Glue adds GG cost plus cost of additional drywall. Products will add some labor expense, detailed analysis shown below in the appendices.

Summary:

Green Glue significantly outperforms these factory damped panels. The advantages in terms of cost/performance are even larger. See appendices for additional discussion.

Appendix 1 - Discussion of Green Glue and factory damped panels.

Factory damped panels are a very good product concept and have some advantages over other types of sound isolation products.

- They are, in theory, simple to install being just a sheet of drywall.
- They are often thin, consuming less space than other options.
- They typically utilize thin drywall. All things equal, in combination with viscoelastic materials a given weight of drywall will perform better if it is made of thinner layers. For example, 4 layers of 1/4" drywall will outperform 2 layers of 1/2" drywall at middle and higher frequencies in combination with damping materials.

Those advantages are perhaps countered by some disadvantages as well. Factory damped sheets typically require power saw cutting, raising installation costs. Some sheets contain hard-to-cut elements as well. Many high performance sheets are extremely heavy, which can again work to neutralize the ease-of-installation advantage. Additionally, there is an assumed 12% waste factor when installing drywall. Above all these products tend to be extremely expensive.

A factory damped panel is typically the most expensive sound isolation option available. Costs can range as high as \$200 for a 4' x 8' sheet, and costs of \$3 per square foot are at the low end of pricing - approached only by the most expensive brands of MLV (Mass Loaded Vinyl). Despite the cost, there may well be applications where their advantages make them the ideal choice.

Cost analysis of these walls:

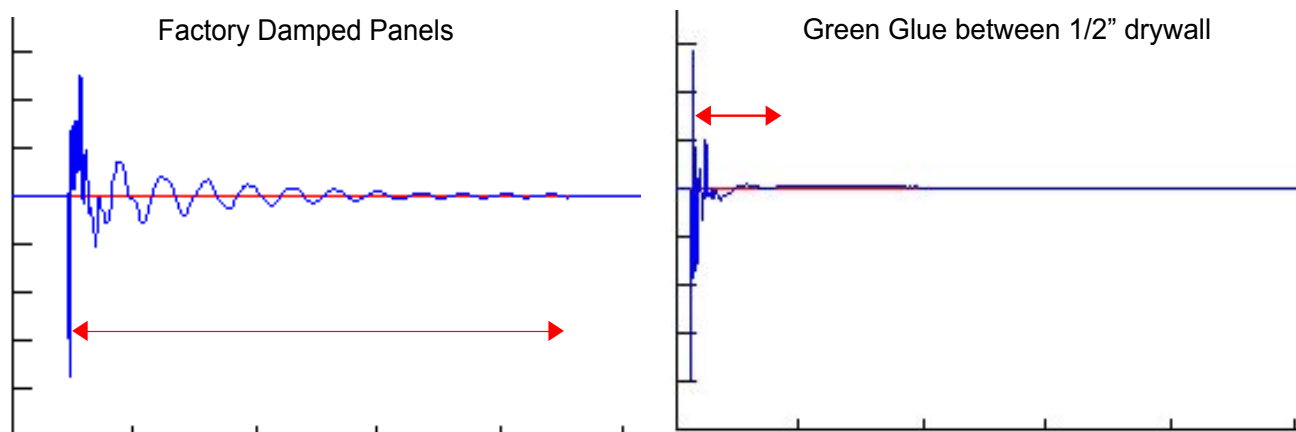
- Costs will obviously vary above and below those reflected below
- Assumes 4x8 5/8" drywall at \$9 a sheet
- Common rough calculation figure that drywallers use is \$10 to hang a 4x8 sheet
- Green Glue retail price used
- 2 tubes of Green Glue per sheet
- Labor rate of \$10 is generous, since the application takes 60 seconds



	Factory Damped Panels	Green Glue Assembly
Damped Panels:	\$120.00	\$0.00
Drywall Materials:	\$0.00	2 at \$9 = \$18 (\$3.75 a square foot)
Drywall Labor:	\$10.00	2 sheets at \$10 = \$20
Green Glue Material:	\$0.00	\$30.00
Green Glue Labor:	\$0.00	\$10.00
Total Cost:	\$130.00	\$78.00

There is an assumed 12% waste factor in drywall jobs. It is much better to scrap \$9 a sheet drywall rather than \$120. A typical 1000 square foot (surface area) room will have roughly 120 square feet of waste (12%). This amounts to \$450 in waste if you use \$120 a sheet drywall.

Comparing Damping Performance. The graphs below illustrate the damping performance of the Factory Damped Panel Assembly and Green Glue Assembly II (two layers of 1/2" drywall damped with GG).

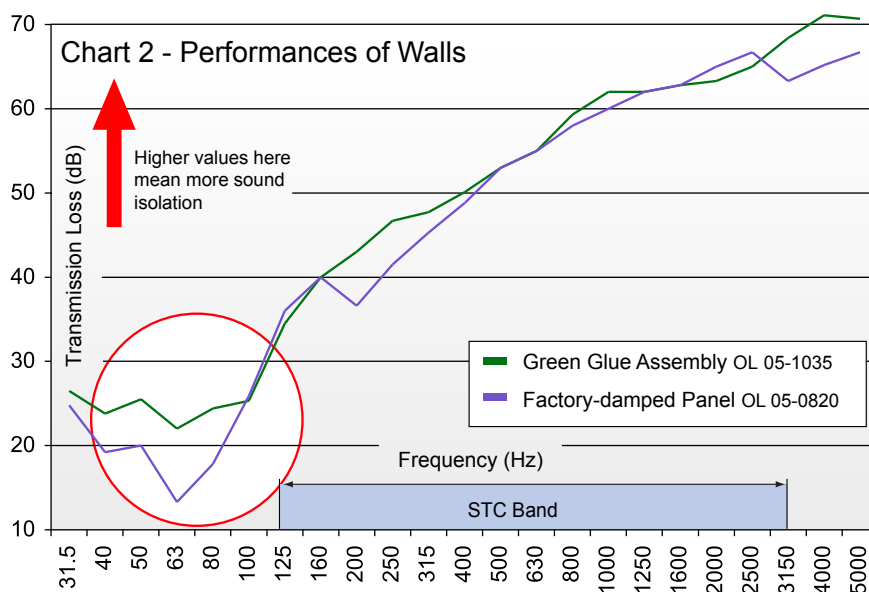


What you see is the vibration resulting from each panel being struck with an impact hammer. The faster the vibration decays, the better the damping. In both cases, the frequency in question is ~100Hz, or very close to the resonance in the walls shown above. The damping of the Green Glue sandwich is no less than 5 times higher, and this despite the fact that the factory damped panels tested have 2 damping layers, not just one.

In the data above, we saw as much as 8dB superior low frequency performance from the Green Glue wall. The extra weight of the GG wall provides about 2dB of that advantage (this can be calculated via something called "mass law"), the superior damping provides the rest. The superior damping of Green Glue allows the middle and high frequency performance to exceed that of the factory damped panels despite utilizing thicker drywall.

Cost-for-cost. The significantly lower cost of Green Glue allows the possibility of utilizing multiple layers of drywall/Green Glue while still keeping system costs well below that of factory damped drywall. While the middle and high frequency performance of this heavier wall was limited by flanking noise in the laboratory, the low frequency advantages are now immense.

Despite the now very large performance advantages, the GG wall remains considerably less expensive.



	Factory-damped	Green Glue Assembly II
STC:	54	56, flanking limited
OITC:	33	39
Full band flat noise, dBA:	46	51
Theater noise, equal loudness:	46	53

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