

## Using Green Glue

### Getting the most out of your Green Glue walls

In this document we will take a look at how to best utilize Green Glue in walls, floors, and ceilings. We will cover the times when Green Glue is a good choice, or perhaps even the best choice available to you, and the times when it is not.

We will also take a look at other commercial products that we recommend in conjunction with Green Glue, and just generally try to communicate how to build a good wall.

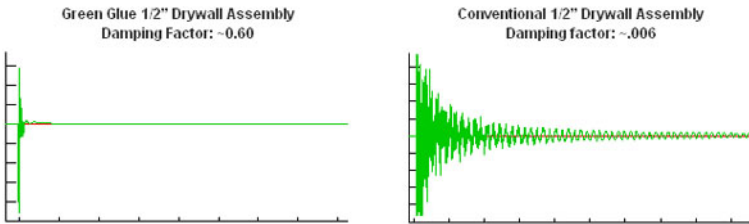
### Using Green Glue part 1 – compatible materials

Green Glue must be used as the center of a "sandwich" between two rigid materials. Also, it is a water-based damping material, and it has to dry, so at least one of the materials must be porous to allow water to evaporate. Fortunately, almost all common construction materials fall into those categories. We will look at material selection for walls, for floors, and for other applications such as soffits.

### Recommended compatible materials for walls

For walls we recommend that you utilize drywall for these reasons:

- Contrary to popular belief, wood products are not better than drywall for sound isolation. They are stiffer, lighter, and just as resonant
- Weight/mass is an important component of wall performance, and we are aware of no material that is lower in cost from a \$\$\$/pound standpoint than drywall



**These graphs show the impact of Green Glue on the damping of drywall.**

The faster the impact vibration dissipates, the higher the damping. In this case – Green Glue sandwiched between 2 sheets of 1/2" drywall -vs- one sheet of 1/2" drywall with no damping – GG yields a damping increase of nearly 100 times.

### General recommendations for drywall combination

<b>To damp 5/8" drywall – (to be the other half of a sandwich featuring 5/8" drywall)</b>	
Best: 5/8" drywall	Comment: 1/4" drywall is sufficiently thin as to not make a truly ideal constraining layer over 5/8" board
Very Good: 1/2" or 3/8" drywall	
Good: 1/4" drywall	
<b>To damp 1/2" drywall</b>	
Best: 1/2" or 5/8" drywall	Comment: as above
Very good: 3/8" drywall	
Good: 1/4" drywall	
<b>To damp 3/8" drywall</b>	
Best: 1/2", 3/8", or 1/4" drywall	Comment: as above
<b>To damp 3/4" specialty drywall</b>	
Best: 3/4" or 5/8" drywall or 1" shaft-wall	Comment: 1/4" drywall is sufficiently thin as to not make a truly ideal constraining layer over 3/4" board
Very good: 1/2" drywall	
Good: 3/8" drywall	
<b>To damp 1" shaftwall (1" thick drywall)</b>	
Best: 1" shaftwall or 3/4" drywall	Comment: the use of 1/4" board is not encouraged in this application
Very good: 5/8" drywall	
Good: 1/2" drywall Fair: 1/4" drywall	

**Drywall choice recommendations by wall type**, the same recommendations apply to ceilings. Drywall screwed directly to the joists or mounted on furring strips is analogous to a single wood stud wall. The use of resilient

channel, sound clips, spring hangers, or separate ceiling joists follow our recommendations below.

Wall Type	Recommended Drywall	Comment
Single wood stud wall or rigid (heavy gauge load bearing) steel stud wall  Green Glue on just one side of the wall	5/8" + 1/2" or 5/8" + 5/8" or 5/8" + 3/8"  Basically any combination is good on this type of wall	It is commonly thought that using different thickness of drywall leads to great performance enhancements. This isn't really true with Green Glue. If you like, you may use 5/8" + 1/2" on this wall type, but using all 5/8" will not be a compromise. Using double 1/2" will slightly lower low frequency performance due to loss of mass, but performance will remain high. Using thinner layers will again cause some loss of low frequency performance due to loss of mass
Single wood stud or heavy-gauge steel stud wall with Green Glue on both sides	5/8" + 1/2" on each side or 5/8" + 5/8" one each side or 5/8" + 5/8" on one side and 1/2"+1/2" on the other side	Same notes as above. For what it's worth, using 2x1/2" on one side and 2x5/8" on the other side is more effective than using 5/8"+1/2" on each side
Resilient channel wall with Green Glue on one or both sides or Thin gauge steel stud wall with Green Glue on one or both sides	It is recommended that you utilize all 5/8" drywall	Resilient and decoupled systems in general are extremely reliant on mass for performance, even more so than the common wood stud wall. Therefore we recommend using all 5/8" drywall on these wall types. Using the same weight of thinner drywall will perform as well. (damping three layers of 1/2" is better than two layers of 5/8") Resilient channel cannot perform as well at low frequencies as modern sound clips or staggered or double stud walls
Resilient sound clips or spring ceiling hangers, Green Glue on one or both sides	It is recommended that you utilize all 5/8" drywall	Same comments as above, just as important
Staggered wood studs, Green Glue on one or both sides	It is recommended that you utilize all 5/8" drywall	Same comments as above. Staggered studs recommended over sound clips. With conventional drywall, clips are considerably superior. So if using Green Glue, staggered studs are better. If you don't use Green Glue, clips are better
Double wood studs, Green Glue on one or both sides	It is recommended that you utilize all 5/8" drywall	Same comments as above, this is the best wall type you can choose, period

### Damping wood products

Damping wood products for applications like floors, soffits, seating risers in home theaters, stages in home theaters, loudspeaker cabinets and so forth.

### We will look at these possibilities material by material:

<b>To damp 3/4" MDF , OSB , or plywood</b> Best: 3/4" MDF, 5/8" drywall, 1/2" MDF, 1" MDF, 3/4" OSB, 11/16" OSB, 3/4" plywood, etc Also good: 1/2" drywall and thinner grades of wood products
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<b>To damp 1/2" MDF, OSB, or plywood</b> Best: 1/2" or 5/8" drywall, 3/4" MDF, 7/16-11/16" OSB, plywoods of similar thickness Also good: wood products 3/8" to 1" thick, 3/8" drywall
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<b>To damp thinner wood products</b> Best: strive to keep thickness within +50% / -33% for the two layers. One layer should not be more than 50% thicker, or less than 33% thicker than the other  Also good: strive to keep thickness within +100% / -50% for the two layers. One layer should not be more than twice as thick, or less than half as thick, as the other
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<b>Soundboard</b> Soundboard can be very effectively damped with Green Glue, and for some applications it is the best choice. However, in general, it is far lighter than other wood types products, and its advantages relative to simply using more drywall or OSB are completely nullified by the presence of Green Glue. Therefore, as a general rule, we recommend that you stick with the heavier materials
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Application	Recommended materials	Comment
Flooring	OSB > plywood	OSB has 3 advantages over plywood. It is 1. Heavier 2. Cheaper 3. Flatter  The combination of these makes it our recommendation for use in conjunction with Green Glue. To use plywood, however, is only a faint difference in performance so if that is your preference then do it without worrying
Soffits	MDF or drywall, or MDF + drywall	Soffits are commonly constructed with Green Glue and MDF. This is an extremely effective combination. However, some customers opt to use drywall for one or both layers of their soffit. This is no less effective for a given amount of weight, but may be more challenging to finish
Loudspeaker cabinets	MDF	Industry standard
Theater risers and stages	OSB, plywood, or MDF	The comments in the flooring section above apply. Weight, cost, and suitability of the wood for your application should take precedence in the choosing process. Green Glue can damp them all extremely well

### Other commercial products

Other commercial products that we recommend in conjunction with Green Glue, and comments on products we don't recommend with explanations of why.

Modern Sound Clips from manufacturers such as PAC International (RSIC clips) and Kinetics Noise (Isomax clips) come modern, engineered sound clips. These clips, as the manufacturers state, outperform resilient channel and provide easier, more reliable installations.

#### To get the most out of a sound clip assembly, follow these guidelines:

1. Use as much mass as possible on both sides of the wall
2. Use as deep of an air cavity as your situation allows. (Using the lower profile clips to save floor space will compromise low frequency performance somewhat.)
3. Use insulation that nearly fills the cavity at least until 6" (R19) of insulation is present

Hundreds of Green Glue customers use GG in combination with sound clips with great success. Sound clips are also good products without Green Glue, and we especially recommend them on ceilings where air cavities are very deep.

### Resilient Channel

Green Glue is a powerful synergist with resilient channel as Green Glue raises the performance of the RC assembly, and almost completely eliminates negative performance problems caused by short-circuiting. From lab tests we have seen that, in terms of STC, GG+RC performs as well as sound clips with the same weight of drywall. The combination of GG+RC may be perfect for applications that are required to meet a specific STC rating by law, such as multi-family dwellings.

That noted, we do not recommend resilient channel for applications where a lot of low frequency noise must be contained. Certain performance features of the sound clips allow them to deliver better low frequency performance than RC.

### Spring Ceiling Hangers

As with clips, we recommend them over clips though we don't know exactly how large the performance difference is. Contact manufacturers for their thoughts on their products.

### Insulation Choice

There is no reason in historical data to believe that any insulation is superior to common building fiberglass. (i.e., the fluffy pink stuff). It's cheap, it's readily available, and it works as well as anything. For situations where a rockwool or mineral fiber type material is called for, we recommend using standard materials and avoiding extremely high-density materials. The reason being that if insulation density gets too high this can have an adverse effect on low frequency behavior.

### Soundboard

A very high performance single stud wall, or ceiling with board screwed directly to the joists can be made with two layers soundboard damped with Green Glue under drywall (preferably also GG damped). For the most part, however, and especially at low frequencies, an even higher performance wall can be made by replacing those soundboard layers with drywall. Therefore as a general rule, except for rare specific applications, we do not recommend soundboard for ceilings or walls.

We do recommend soundboard, if you wish to utilize it, as an underlayment for flooring. It works very well in conjunction with Green Glue in this application.

Related Article: [Upgrading Existing Floors, Green Glue -vs- Soundboard, Green Glue Application Notes](#)

## Mass loaded vinyl and other limp mass products

MLV can raise the performance of a Green Glue wall by supplying extra mass. However, adding another layer of Green Glue + drywall to the wall supplies far more mass, and enhances the damping of the system. It is also much less expensive. Therefore, for bang-for-your-buck, more GG and drywall will always outperform adding MLV to your GG wall. See our document on GG vs MLV for details.

Green Glue works well with MLV as a flooring underlayment. Sandwiches such as:

- Tile/cement board/etc
- Mass loaded Vinyl (MLV)
- Green Glue(GG)
- Subfloor

show extremely effective damping, allowing the best traits of both products to be exhibited.

## Shredded Rubber Underlayments

Same comments as for MLV above, but the thicker heavier rubber underlayments tend to be more effective than MLV. They also tend to cost more. Other underlayments.

GG can be used as described above in combination with underlayments that feature a solid surface. It cannot be used in combination with underlayments that, for example, are based on open webbing.

## Factory Damped Drywall

GG can be used in between layers of factory damped drywall, and will contribute to performance. However, the extremely high cost of factory damped drywall and superior performance of GG in lab tests leads us to believe that you may be wise to opt for conventional drywall and Green Glue. If you want more performance, just use more layers or improve your wall type from single wood stud to staggered or double studs.

## Specific recommendations for walls

The following table, is our specific recommendations for walls with comments about specific applications, reasons for the recommendation, and so forth.

Rank	Wall type	Comment
Perfect	Double stud walls	A Green Glue double stud wall is, quite simply, the highest performance wall that you can build, period. For higher performance, add more layers of drywall and GG.
		It is extremely likely that if you build a double stud wall with Green Glue on both sides that flanking noise will limit performance. In fact, this wall is limited by flanking noise in most of the laboratories in the world. So if you build this type of wall, remember that you will have to mind the details to reap the full scope of its tremendous potential.
Excellent	Staggered wood stud walls	The damping of Green Glue makes the structural connection at the top and bottom plate far less important than with conventional drywall.  Basic real-world tradeoff relative to double studs is just the shallower air space. Tremendous wall.
Very good	Sound clips walls  Deep steel stud walls  Wood stud walls with studs at 24" OC  Wood stud walls with studs at 16" OC and furring strips perpendicular to the studs at 24" OC on one side of the wall (or both sides)	For this portion of our recommendations, we have to categorize just a bit.  For applications where STC is important, the use of GG on deep (6") steel stud walls can easily yield STC's well into the 60's. So can GG on sound clip walls. The 24" OC wood stud walls will yield STC's in the mid to high 50's with excellent low frequency performance.  Now, for applications such as home theater, with a lot of low frequency noise we recommend deep steel studs or the 24" OC assemblies over the sound clip walls. The reason for this is that spending your money on more drywall / GG (even if you use 50% GG when using multiple GG layers to keep GG costs the same) will pay off much more at low frequencies than adding sound clips to the wall. In fact, a single wood stud wall (regardless of stud spacing) with GG is superior at subwoofer frequencies to clip assemblies of similar mass. We have certified lab data to support our comments.  We recommend a base layer of 5/8" drywall whenever the surface you are working with has framing members or furring members wider than 16" on center.

Good	16" OC wood studs	16" OC wood studs + Green Glue makes one heck of a wall, and we DO NOT recommend ripping off existing drywall to add furring strips – instead we recommend taking that money and labor and adding 2 more layers of drywall/GG to the existing wall. This is perhaps the best bang-for-your-buck upgrade to an existing wall possible.  Nonetheless, narrow spaced studs will perform somewhat less than wider spacing. The reason for this is that part of GG's contribution to sound isolation is the dissipation of energy as it travels across the wall panels. With 24" stud spacing there is more distance for the sound to travel before it reaches a mechanical connection.
Fair	Resilient channel assemblies or thin gauge steel stud assemblies with studs of 3.5" depth or less	While RC+GG can yield tremendous STC (into the 60's if you want it to be), performance at low frequencies is less than the wall types above.  Please note, however, that these assemblies will have higher STC than wood stud assemblies, pound for pound. They just can't match the low frequency behavior of a well damped wood stud wall.

### Specific Recommendations for Ceilings

The following table, with comments, is our specific recommendations for ceilings with comments about specific applications, reasons for the recommendation, and so forth.

Rank	Wall type	Comment
Best	Room within a room / separate ceiling joists see diagram on next page	A Green Glue room within a room is as good of a structure as you can build. It is virtually certain that flanking noise will exceed direct noise in an assembly such as this.  To improve this assembly use more layers of drywall + GG, or (more importantly) tend to all the flanking paths that can lower performance.
Excellent	Spring ceiling hangers and modern sound clips	On a ceiling we recommend hangers and clips over Green Glue in terms of performance. The reason for this different recommendation is that the hangers and clips are better able to take advantage of the very deep cavities than can a Green Glue ceiling screwed directly to the joists. Using GG in combination with these products is even better, however, and extraordinary ceilings are possible. We would select double 5/8" drywall with no GG on clips or hangers before double 5/8" drywall + GG on furring or screwed directly to the joists.
Very good	Furring strips 24" OC and perpendicular to the joists or joists spaced 24" OC	These can make truly excellent partitions that do have some advantages relative to the hangers/clips. However, we stand by our recommendation of hangers/clips as superior to GG alone for ceilings (again, due to the deep air cavity). STC's well into the 50's with great low frequency performance are possible with these assemblies
Good	Drywall screwed directly to the ceiling joists	Adding another layer of drywall to your ceiling with Green Glue in between is probably the lowest cost, most convenient upgrade that you could find. Hundreds of customers have used these ceilings with great results, and low frequency performance is excellent. Still, furring strips are incredibly cheap and do add performance.
High Recommended	Use Green Glue on the sub-floor above	GG on sub-floors is perhaps the best application in a home. It helps greatly with both airborne and impact noise, and we recommend it.

Please don't add springs or furring to an existing drywall ceiling. You will create a triple leaf effect.

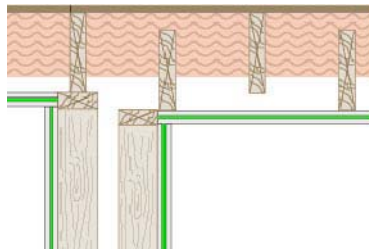
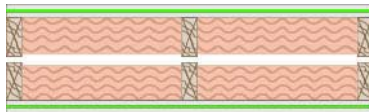
### Drywall choice recommendations by wall type

**Double stud walls** – the highest performance wall. Two rows of studs with separate plates separated by an air space of typically 1-3". Performance relative to conventional walls is enhanced by the lack of mechanical connection between the sides.

As with all walls – but especially on decoupled walls such as this – it is recommended that you use double drywall on at least one side of the partition for best results.

**Room within a room.** This construction features double stud walls, with the inner set of studs supporting a separate set of joists for the room's ceiling.

This construction allows the benefits of double stud walls to be fully realized, as mechanical connections to the rest of the structure are thoroughly minimized. This diagram shows a horizontal wood strip. In this ceiling, the drywall is attached directly to the inserted joists.



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