FOR SOUND ATTENUATION, CELLULOSE INSULATION OUTPERFORMS ALL OTHER INSULATION SYSTEMS

SOUND AND INSULATION

Installing cellulose insulation like Greenfiber® within a wall cavity provides a significant improvement of the STC rating and brings a notable peace and quiet to the living environment.

Cellulose installed within a 2x4 wall cavity adds approximately 5 dB of sound reduction, while cellulose in a 2x6 wall cavity adds about 9 dB to the STC rating, according to acoustic performance tests.

For sound absorption and noise reduction benefits, Greenfiber offers blown-in or spray-applied cellulose insulation.

What is STC?

Sound Transmission Class (STC) is a numerical rating in decibels (dB) of an assembly's ability to reduce airborne sound transmission over a limited frequency range. ASTM Test Method E90 is used to generate transmission loss data on an assembly, and ASTM E413 uses this data to calculate an STC rating. The single-number ratings correlate with sound transmission for speech, radio, television, and similar sources of noise.

STC Ratings Compared

STC Rating	What Can Be Heard	Performance
25	Normal speech is easily heard	Very Poor
30	Loud speech is easily heard	Poor
35	Loud speech is heard, but not understood	Average
40	Loud speech is heard, but only as murmur	Good
45	Loud speech is not heard. Music and heavy traffic may be a problem	Very Good
50	Only very loud sounds are faintly heard	Excellent
60+	Virtually little to no sound is heard	Outstanding

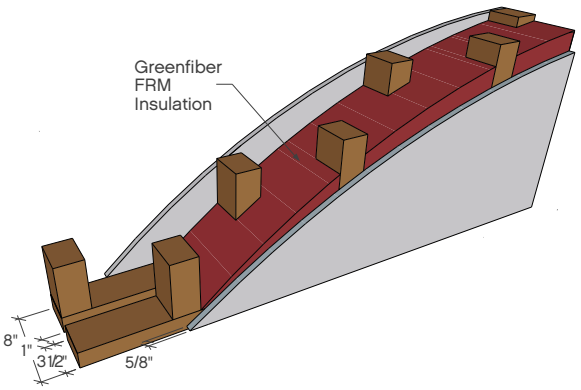
BUILDING MATERIALS AND SOUND TRANSMISSION

Materials and Construction

Metal framing reduces sound transmission significantly better than equally dimensioned wood, as does wider spacing between framing members, regardless of material.

Likewise, a break or separation between materials in the path of sound, the vibration path, can significantly reduce sound transmission. Staggering the studs, as specified in the Greenfiber U370 - SANCTUARY 2-Hour Firewall, can provide a substantial increase in sound isolation, ranging from a STC rating of 60 in an 8" cavity with one layer of drywall to 66 with two layers of drywall.

The mass or weight of an assembly's membrane also contributes to sound control. For example, added sheets of gypsum board absorb more sound.



- 2x4 double wall 16" on center staggered
- 1" gap between walls
- FRM100 spray applied
- 5/8 sheet rock Type C or Type ULIX

Greenfiber LLC
5500 77 Center Drive, Suite 100 Charlotte, NC 28217 | Toll Free: 800-228-0024 | Office: 704-379-0640 www.greenfiber.com

THE PROOF IS IN THE PERFORMANCE

New homes and communities throughout North America are increasingly built in closer proximity to each other and next to airports, highways and noisy urban corridors. As a result, noise pollution is rapidly becoming a key factor in homeowner comfort; leading local, county, and federal regulators to set standards that require Noise Level Reductions (NLR) of 25 decibels (dB) or greater in certain areas.

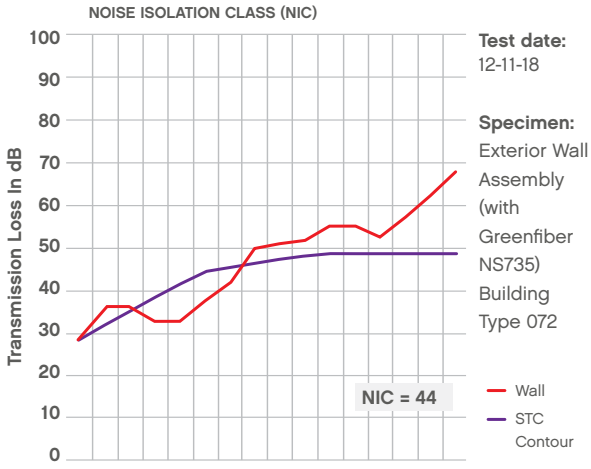
Noise Level Reduction (NLR) testing was conducted on a project in the Las Vegas area that specified Greenfiber insulation. The results met the stipulated 25 decibel reduction by at least 5 decibels – a "clearly noticeable" amount.

Field NIC Testing

Field Noise Isolation Class (NIC) testing was conducted on identical homes with 2x4 wall types in order to compare the performance of R-13 Greenfiber insulation and R-15 fiberglass batts within exterior wall construction.

The testing proved a reduction of 44 NIC points with Greenfiber vs. 40 NIC points with fiberglass batts. This difference of a 4 point performance is equivalent to a 60% reduction in sound power.

Field Testing Results



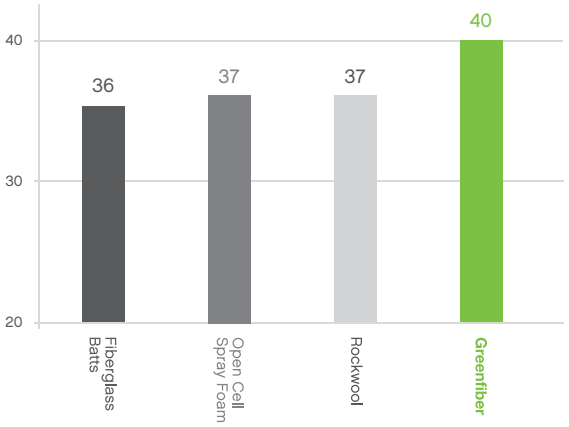
* Field STC testing was completed using NIC methodology.
Note: Windows within the receive room could have allowed a flanking path. This potential weak-point could have biased (understated) these results.

CELLULOSE INSULATION OUTPERFORMS

Where air flows, sound follows. Because Greenfiber is denser than other types of insulation and is blown in to fill each space, it breaks the path of sound, providing superior reduction of noise transfer when applied to exterior and interior walls.

The chart below shows the improvements in STC ratings for different types of insulation in a 2x4 wood stud wall that is 16" oc with 5/8" drywall on both sides.

STC Ratings And Insulation Types



Note: Based on STC ratings for the same assembly for Owens Corning 3.5" Quiet Zone Batt, Rockwool 3.5" Comfortbatt, Icynene 3" Open-cell spray foam, Greenfiber 3.2 pcf dense-pack cellulose. 2x4 wood stud wall, 16" oc with 5/8" drywall on both sides.

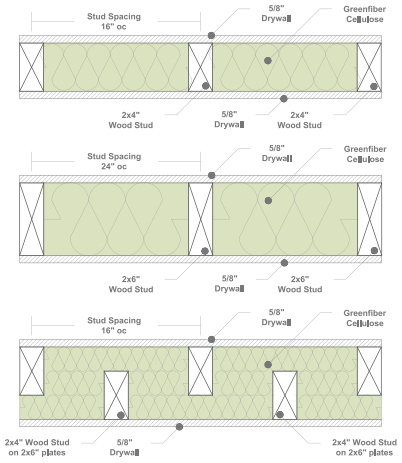
Greenfiber cellulose insulation fills cavities from side-to-side and top-to-bottom, without gaps or voids around obstructions like blocking or bridging, and it fits tightly around wiring or electrical boxes within the cavity for a Grade-1 install that blocks sound and resists air infiltration.

WALL/FLOOR & CEILING ASSEMBLIES

Below is a comprehensive list of wall assemblies tested for their acoustic performance, including STC and fire ratings for wood and steel stud walls.

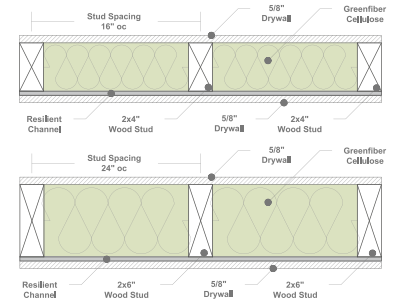
Wood Stud Wall Assemblies

Test Number	Wood Stud Dimensions	Stud Spacing	5/8" Drywall	Resilient Channel	Insulation	STC	Fire Rating
TL24-455	2" x 4"	16" oc	Single Both Sides	None	Greenfiber Cellulose	40	1-hr
D0568.01D	2" x 6"	24" oc	Single Both Sides	None	Greenfiber Cellulose	44	1-hr
RAL-TL93-102	2" x 4" on 2" x 6" plates	16" oc staggered	Single Both Sides	None	Greenfiber Cellulose	52	1-hr



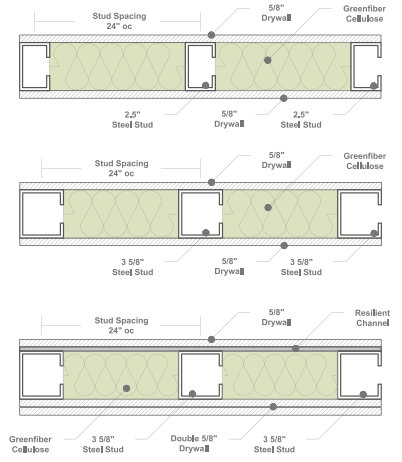
Wood Stud Wall Assemblies With Resilient Channel

Test Number	Wood Stud Dimensions	Stud Spacing	5/8" Drywall	Resilient Channel	Insulation	STC	Fire Rating
TL24-456	2" x 4"	16" oc	Single Both Sides	One Side	Greenfiber Cellulose	51	1-hr
D0568.01E	2" x 6"	24" oc	Single Both Sides	One Side	Greenfiber Cellulose	54	1-hr



Steel Stud Wall Assemblies With Resilient Channel

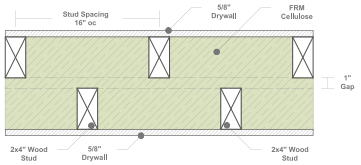
Test Number	Steel Stud Dimensions	Stud Spacing	5/8" Drywall	Resilient Channel	Insulation	STC	Fire Rating
RAL-TL93-7	2.5"	24" oc	Single Both Sides	None	Greenfiber Cellulose	50	1-hr
TL93-187	3-5/8"	24" oc	Single Both Sides	None	Greenfiber Cellulose	54	1-hr
RAL-TL93-72	3-5/8"	24" oc	Double Both Sides	One Side	Greenfiber Cellulose	56	1-hr

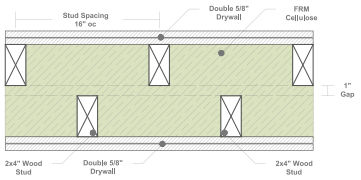


WALL/FLOOR & CEILING ASSEMBLIES

U370 Fire Rated Wall Assemblies - Staggered Stud

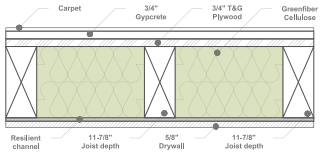
Test Number	Wood Stud Dimensions	Stud Spacing	5/8" Drywall	Resilient Channel	Insulation	STC	Fire Rating
RAL-TL25-222	2 - 2" x 4" walls, 1" gap in between	16" oc staggered	Single Both Sides	None	FRM Cellulose	60	2-hr
RAL-TL25-223	2 - 2" x 4" walls, 1" gap in between	16" oc staggered	Double Both Sides	None	FRM Cellulose	66	3-hr

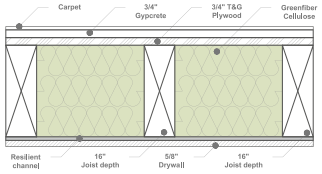




Floor And Ceiling Assemblies

Test Number	Joists	Ceiling	Subfloor	Carpet	Insulation	STC	IIC
B5323.03B	11-7/8" Joist depth	5/8" Drywall - Resilient Channel	3/4" T&G Plywood - 3/4" Gypcrete	Yes	Greenfiber Cellulose	53	54
B5323.01B	16" Joist depth	5/8" Drywall - Resilient Channel	3/4" T&G Plywood - 3/4" Gypcrete	Yes	Greenfiber Cellulose	53	56

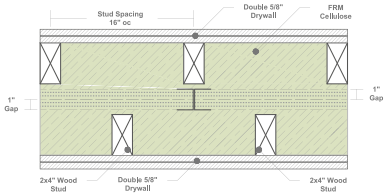




AREA SEPARATION WALL ASSEMBLIES (ASW) WITH CELLULOSE INSULATION

ASW Shaftliner assemblies are non-load bearing. These assemblies, built with 1-inch gypsum shaftliner panels and metal studs, allowing installation from one side where access is limited. In select tested designs, cellulose insulation can be specified within ASW assemblies, delivering proven sound performance while maintaining the required fire rating.

Greenfiber can be used in the following ASW assemblies: U347, V351 and V375.



greenfiber creators of SANCTUARY

Learn About Building a SANCTUARY® Home

With SANCTUARY® insulation, you'll have much more to offer today's home buyers than traditional means of differentiating quality. To achieve the wellness-branded advantage of a Sanctuary Home, connect with a representative by visiting greenfiber.com/sanctuary or calling 800-228-0024.

greenfiber.com/sanctuary ▪ 5500 77 Center Drive, Suite 100 Charlotte, NC 28217

greenfiber.com ▪ twohourfirewall.com