

# DOORS YOUR BIGGEST SOUND LEAK



## SOUNDPROOFING INSTALLATION MANUAL

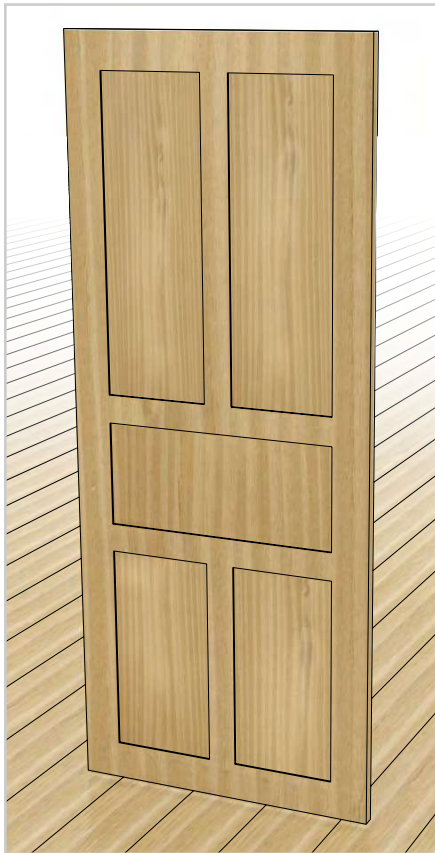


## Doors are Your Biggest Sound Leak

You can build walls with very high levels of isolation, perhaps to an STC beyond 70. Your single door won't likely make it past 30, however. Doors therefore remain the biggest sound leak in a sound-controlled room. Poor seals and lack of mass (weight) are the two biggest reasons. This wouldn't be such an issue except for the fact that the door opening is such a large hole in the room.

If you're going to be successful soundproofing your room, you'll have to deal with the door.

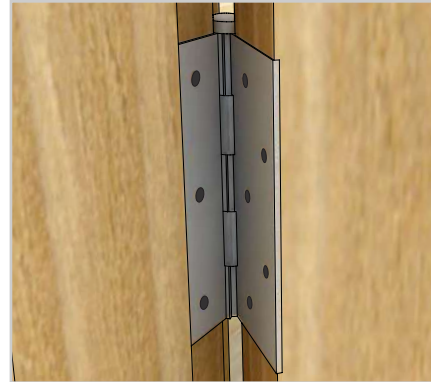
It's helpful if we look at the parts of a door:



DOOR SLAB



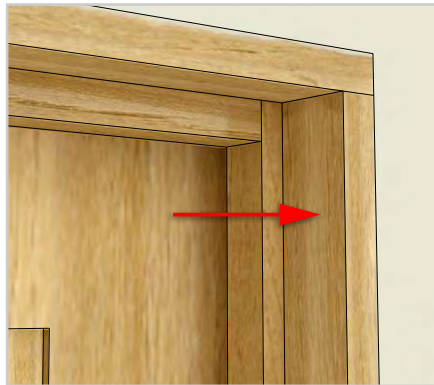
THRESHOLD



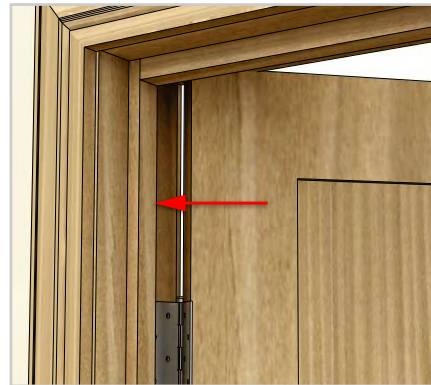
HINGES



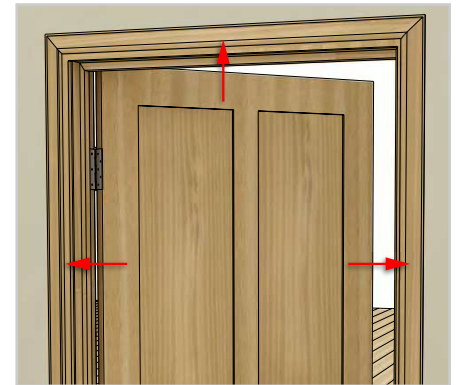
LOCKSET



JAMB



DOOR STOP MOLDING

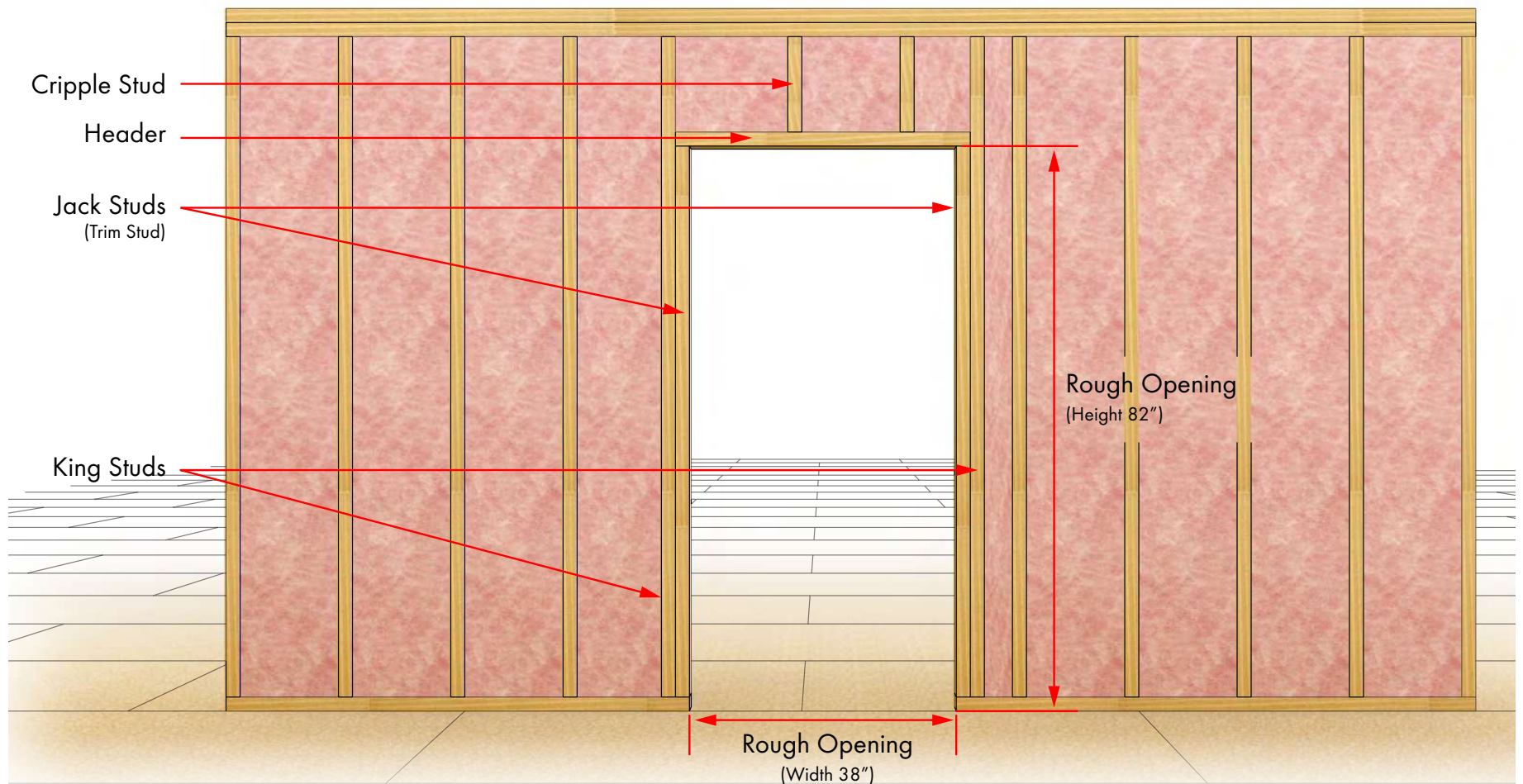


DOOR CASING



## So what are the best door choices?

This is the door framing behind the drywall.  
Our door "Rough Opening" would be 38" wide.



## Which Door Do We Choose?

When we are looking at sound isolating doors, we are mainly looking for two things:

1. Get the heaviest door slab you can.
2. We want good door seals so sound doesn't leak around the door slab itself.

### The Door Surface

Smooth "flush" slabs are better than recessed panel slabs. The recesses are thin, weak points, and the recessed panel slabs weigh less than the smooth, flush slabs. Also, you can much more easily laminate a sheet of MDF or other heavy panel to the door slab if the door slab is smooth. You don't want to trap small air cavities when laminating.

### What is inside the door slab itself?

Next we look at what is inside the door slab itself. A "solid core" interior door slab is filled with heavy particleboard, MDF, or mineral core (think drywall-filled). The great mass of this solid core slab will definitely help. Interior doors are available in 1 3/8" or 1 3/4" thickness. You should choose the 1 3/4" slab, as it has more mass.

Exterior door slabs are generally foam filled. Foam is great for thermal insulation but not so good for acoustic isolation. The foam core offers much less mass than a solid core. Exterior slabs are generally not as aesthetically welcomed as an interior door, and come equipped with a steel or aluminum threshold.

**Avoid hollow core doors at all costs.  
No mass means no isolation.**



SMOOTH "FLUSH" SLAB



RECESSED PANEL SLAB

	Interior Solid Core Door	Exterior Foam Insulated Door
Mass	•	
Seals		•
Aesthetics	•	
Price	•	



## Interior or Exterior Door?

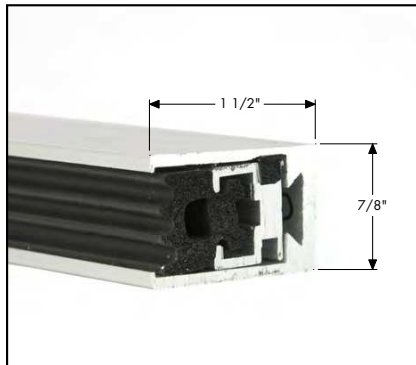
Do you choose an interior door, or an exterior door? Both types of doors have their own advantages. Essentially the interior doors are heavier, while the exterior doors are sealed. Both are reasonably priced under \$200. So what is the best door choice?

### SOLUTION 1

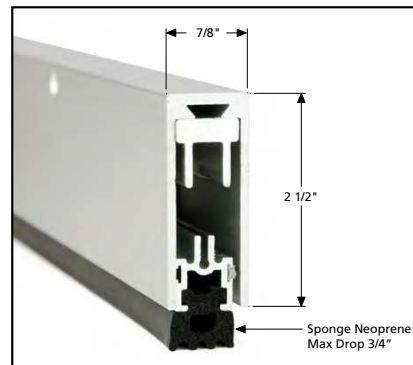
**Best choice** is to get a simple pre-hung solid core interior door and attach special seals and gaskets. This is a reasonable cost and highest performance.

- Consider a thicker, more massive 1 ¾" thick slab rather than the thinner 1 3/8".
- Choose a smooth door surface rather than a recessed panel door slab.
- Install aftermarket specialized acoustic door seals (See Door Seals).

This will yield a very massive and extremely well sealed door, without the sometimes compromising metal threshold on the floor that comes with an exterior door.



Acoustical Door Stop



Automatic Door Bottom

### SOLUTION 2

Go to a real door shop (not one of the "big box" stores) and have them mount a solid core interior door slab on an exterior door jamb. They will have a broad selection of both of these in stock. This gives you the mass of an interior slab combined with the seals that the weather-stripped exterior jamb provides. The potential downside to this choice is that you will have the metal door threshold on the floor.



Metal door threshold that accompanies a standard exterior door.

### SOLUTION 3

Buy an exterior door; Steel or fiberglass, it doesn't matter. They are typically foam-filled, but get the heaviest one. This isn't as heavy as a solid core, however they are minimally acoustically sealed.

### SOLUTION 4

Purchase an interior pre-hung solid core door and add your own weatherstrip from the hardware store. The biggest issue remains the gap at the bottom of this door.

## IF 1 IS GOOD, 2 IS BETTER

Even the best sealed, heavy door described above will still only get into the low 40s for an STC sound rating. This is the problem with any single door. Your walls may be STC 60+.

The best solution is to create a communicating door system. Two doors face each other to create an airlock when both doors are closed. This works well when you have a thicker wall such as a staggered stud or double stud wall.

While the pictured communicating doors are great performers, they can be awkward for some. The two doors are very close together and require one door to open into your finished room. This can take up valuable real estate if you have furniture near the door opening. Additionally for commercial buildings, all doors must open out and away from the occupied room in case of an emergency evacuation. This means that nightclubs cannot use this door configuration.



You will need to accommodate the protrusion of both door handles.

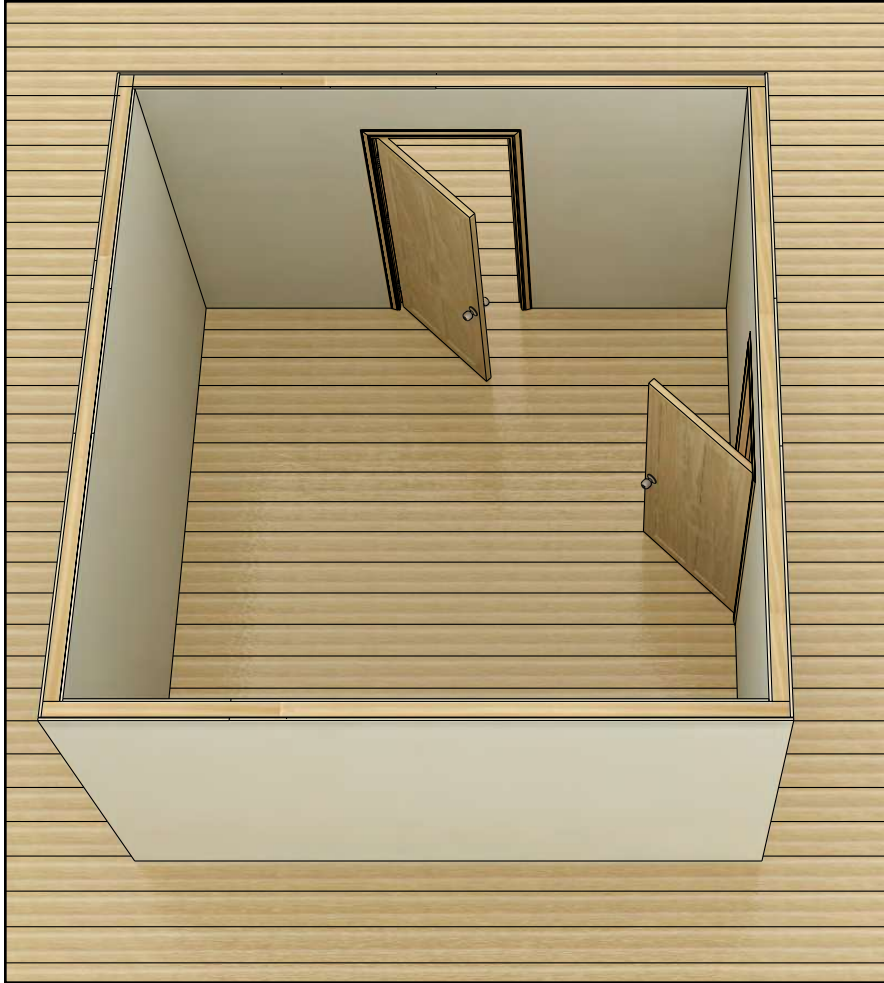


This system requires the inner door to open into the theater or recording studio.

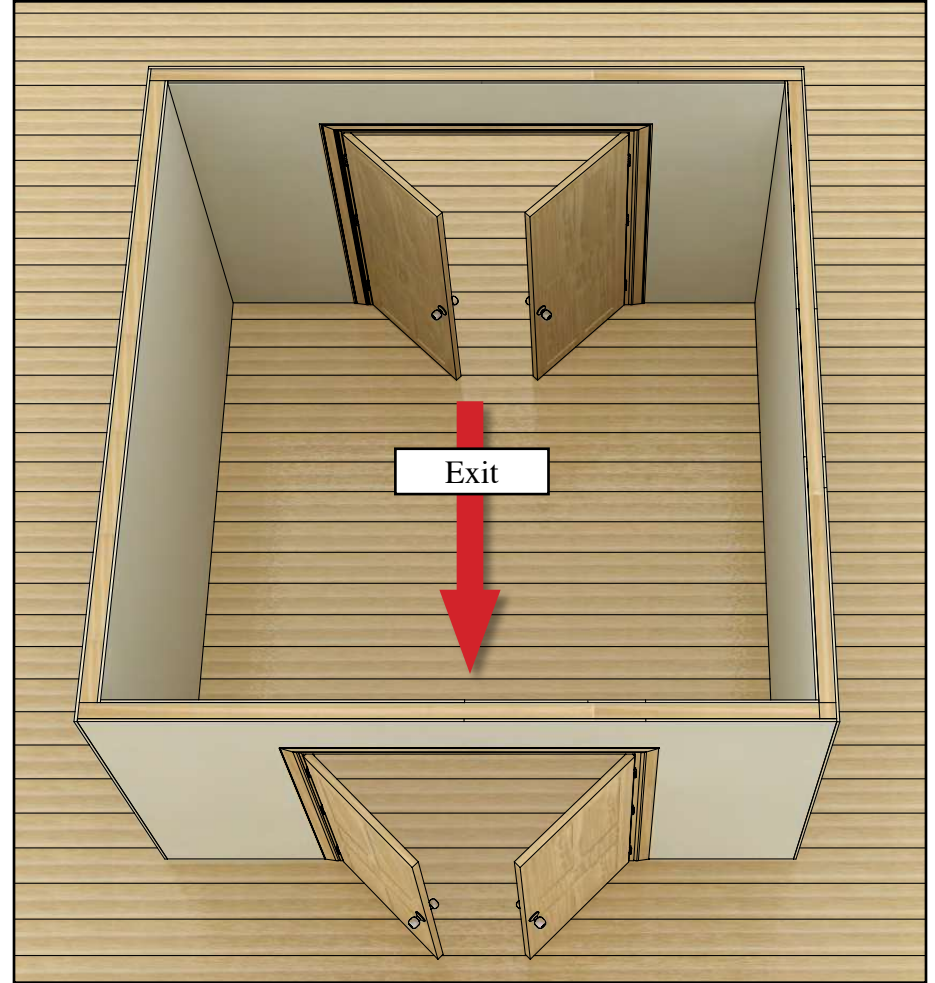


## USE A SMALL LOBBY

Improve on the communicating door concept by having a small room (lobby) at the entrance to your new room. This can be a room as small as 6x6. You can add a theme item such as candy counter or popcorn machine if you're building a theater.. The small room introduces a much larger air cavity which is excellent. It's also more convenient for door placement and ease of entry. With this approach, the door directly to the studio or theater can open into the small lobby, rather than into the sound room.



The lobby area is treated in the same sound isolated manner as the actual Sound Room. Doors can swing in or out of Lobby area depending on the needs.



Commercial -Type Exit

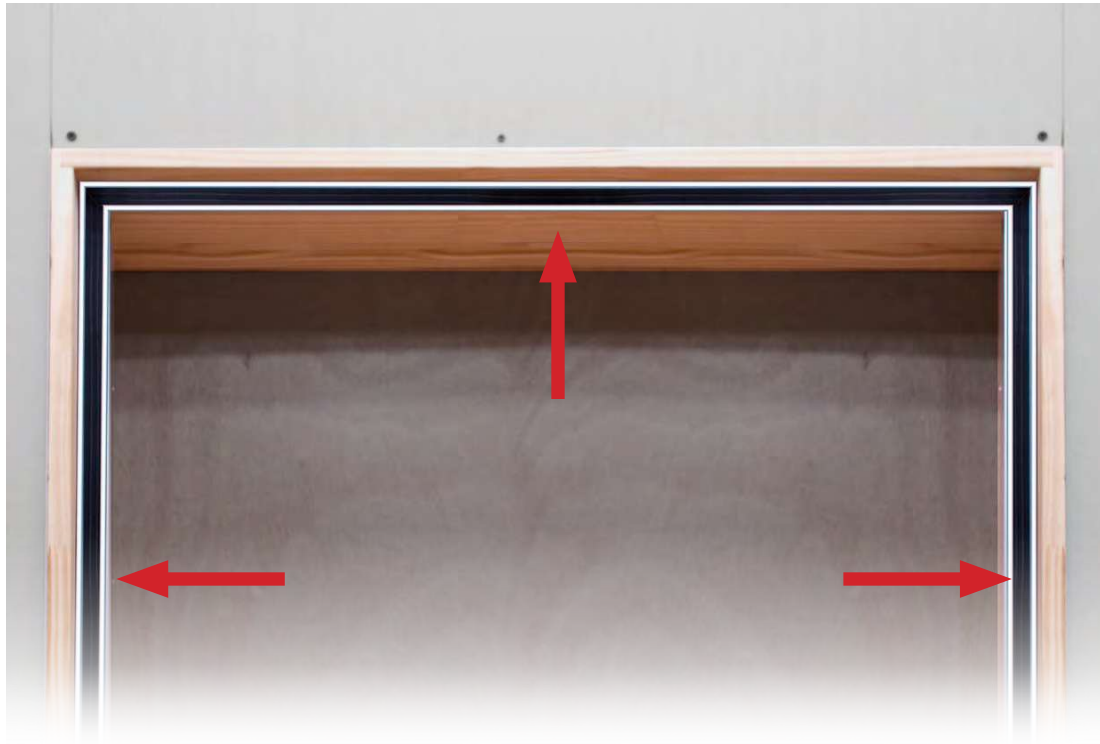
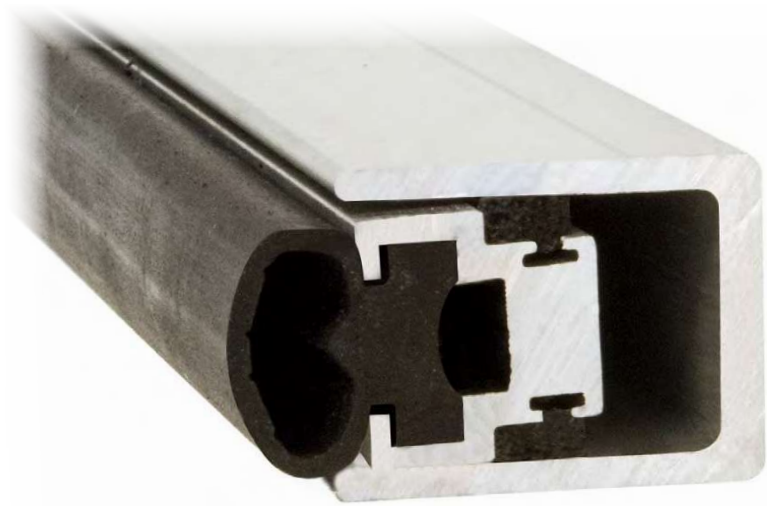
## Sealing Your Door Up

Now that we have our doors selected and entry path designed, let's focus a bit on sealing up the doors themselves.

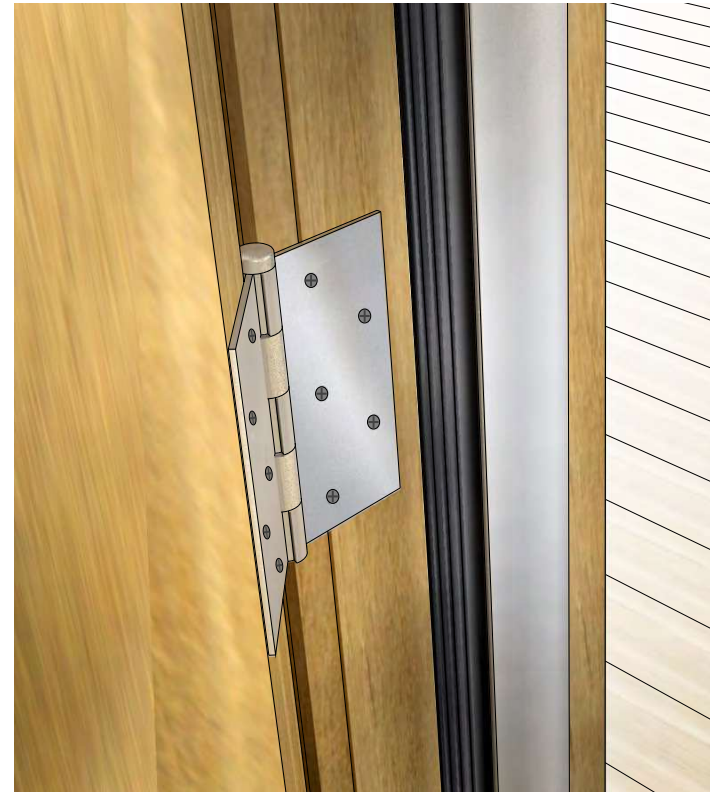
### ACOUSTIC DOOR STOPS

These will seal up three sides of a door. They are used in conjunction with the Automatic Door Bottom.

If your existing wood door stops are removable, then simply replace them with the new Acoustic Door Stops. These types of systems use high quality Neoprene and are fully adjustable after installation.

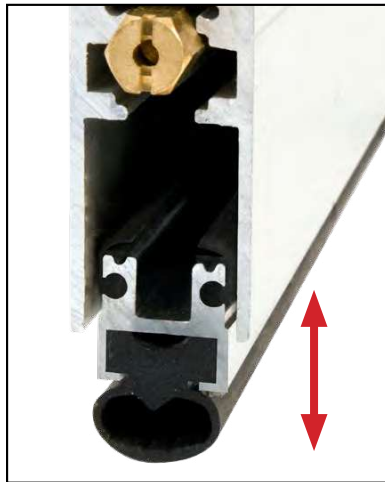


Installed Door Stop on right, left and top.



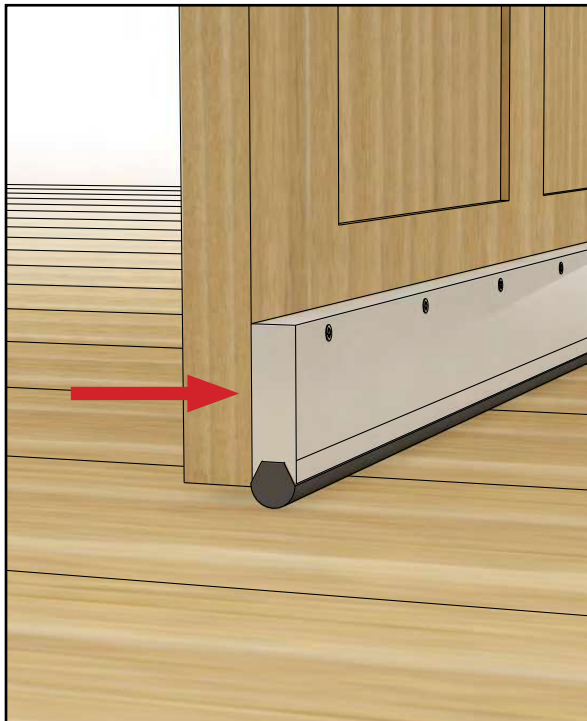


## AUTOMATIC DOOR BOTTOM

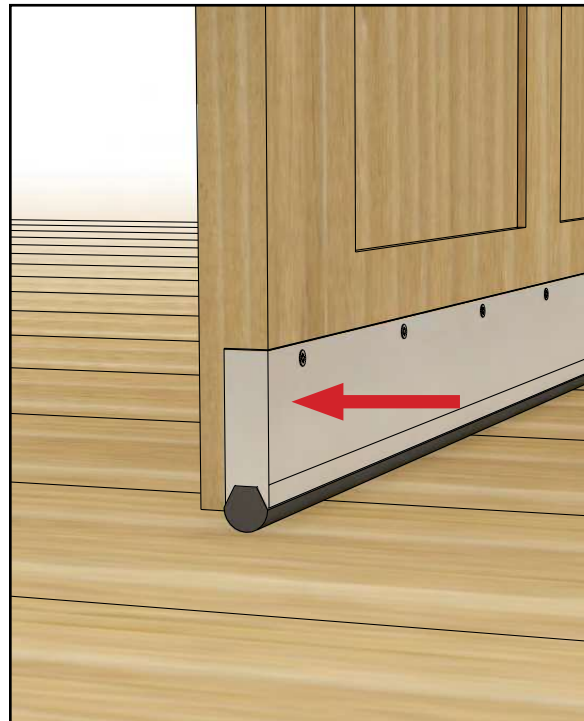


This will seal the bottom of the door. The Neoprene bottom deploys downward when the door is closed. When the door opens, the Neoprene retracts back up into the aluminum housing.

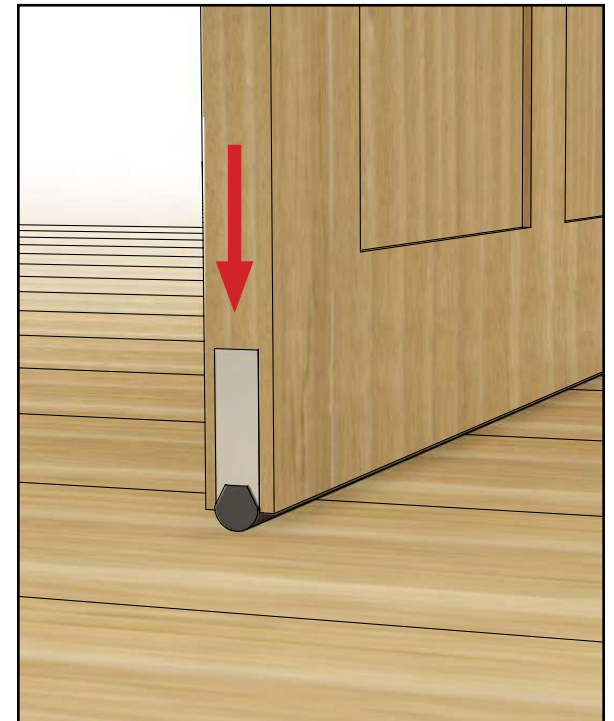
This door seal system can be used with or without a door threshold. A hard surface such as wood or stone is required for the Neoprene to seal to. Carpet of any kind is not suitable.



Surface Mounted Installation



Semi-Mortised Installation



Fully-Mortised Installation

## Seal The Rough Opening

If you remove the door casing (trim molding) in your home, you'll likely find a big gap between the drywall and the door jamb.

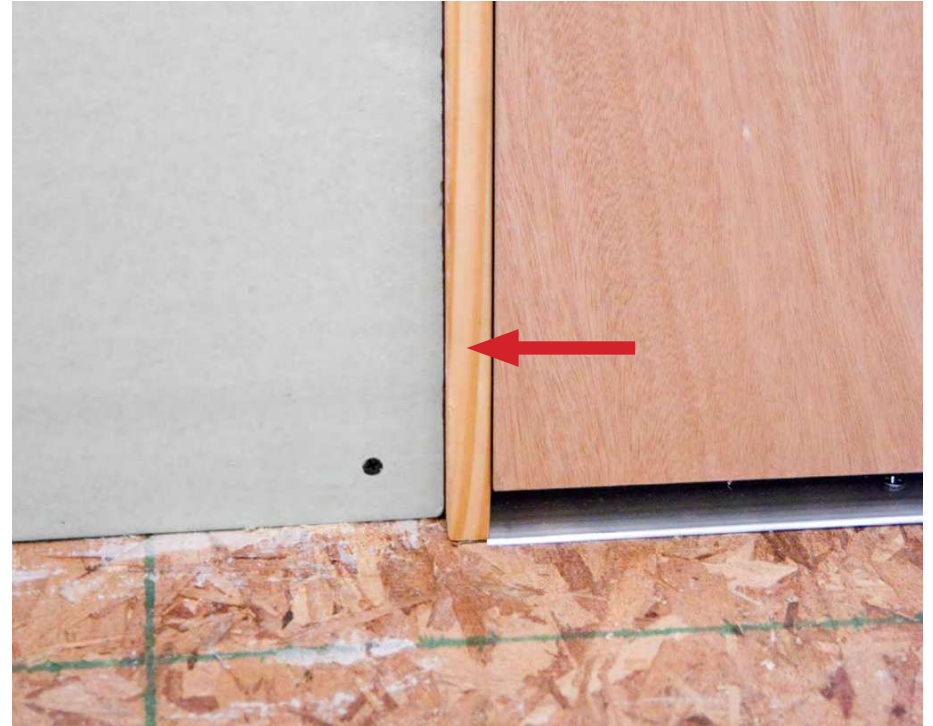
This gap is usually covered up with the lightweight piece of decorative trim molding, but you would rather have the mass of the missing drywall, not the gap. This isn't bad construction; it simply isn't optimized for soundproofing.

When installing the drywall, run it all the way to the door jamb and seal with Acoustical Sealant.

If the drywall was not installed this way, fill the gap with non-expanding foam or better, use some plywood, 2x material, or MLV and seal with acoustic sealant.



Typically a large gap between the drywall and the door jamb is left when a door is installed. This is a great spot for sound to leak through.



Ideally you would like to run drywall to the edge of door jamb and seal any gap with Acoustical Sealant.



# BACKER BOX

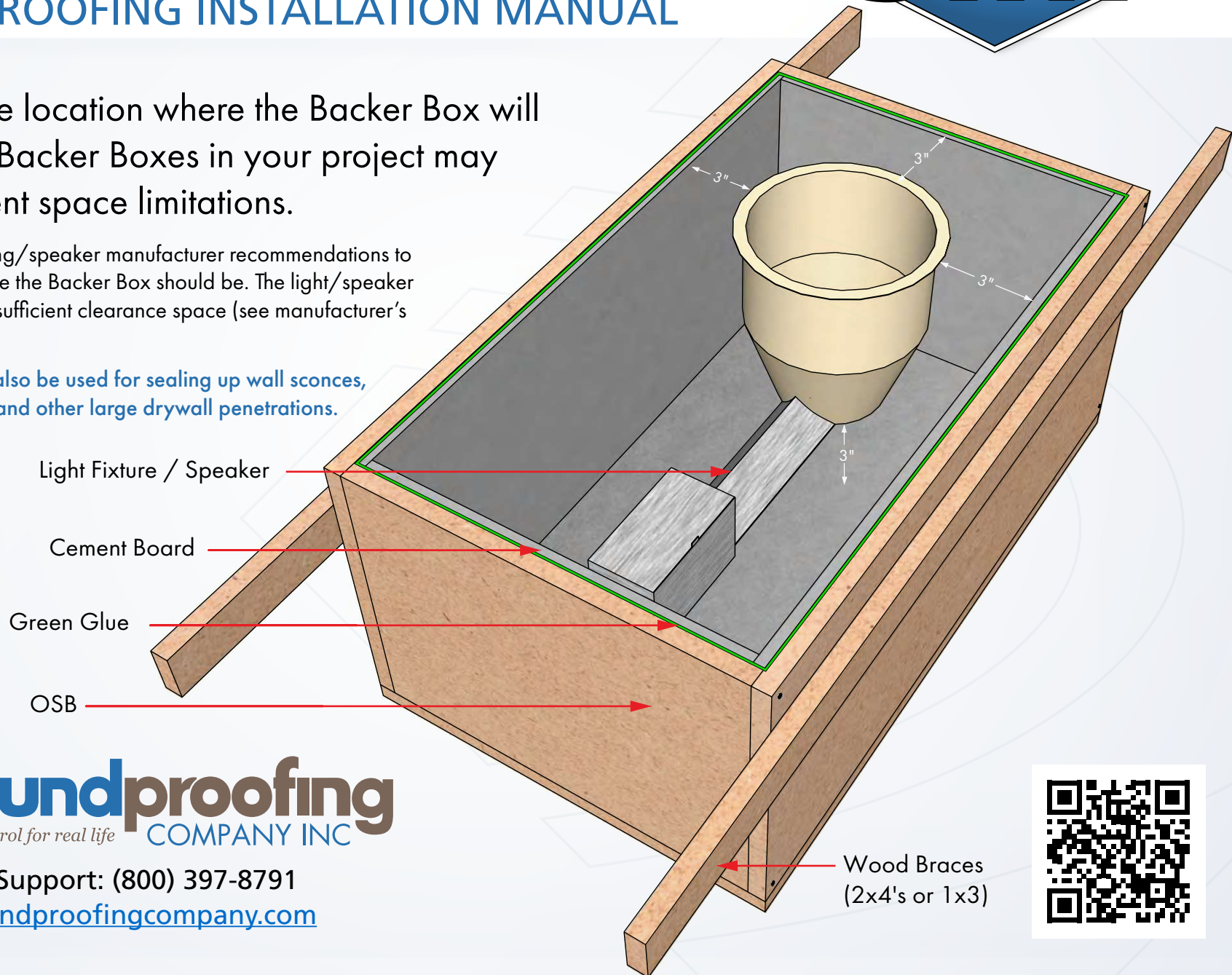
## SOUNDPROOFING INSTALLATION MANUAL

# SIM

Consider the location where the Backer Box will be placed. Backer Boxes in your project may have different space limitations.

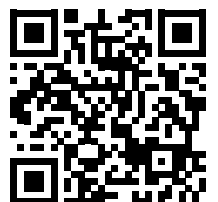
Following the lighting/speaker manufacturer recommendations to determine how large the Backer Box should be. The light/speaker can needs to have sufficient clearance space (see manufacturer's recommendations).

Backer Boxes can also be used for sealing up wall sconces, multi-gang outlets and other large drywall penetrations.



Sale and Support: (800) 397-8791

[www.soundproofingcompany.com](http://www.soundproofingcompany.com)

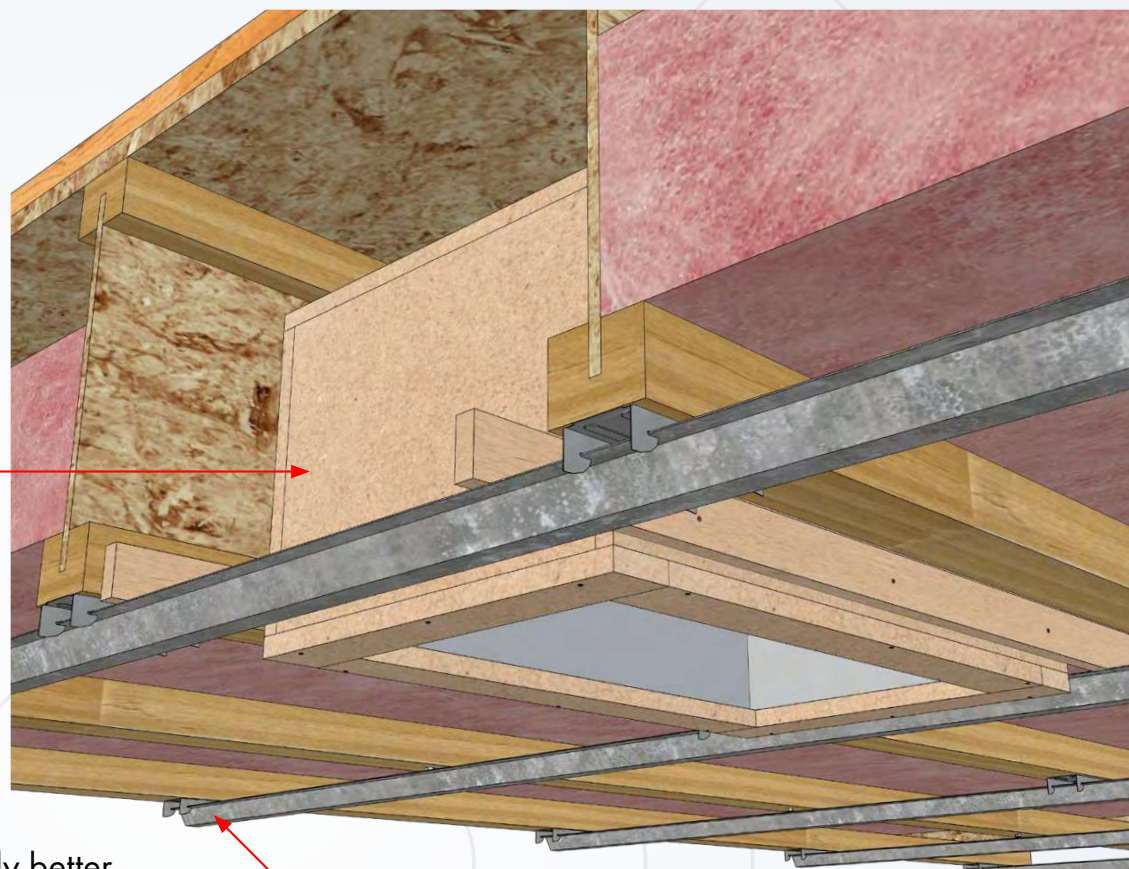


We all love the look of the light from an array of recessed ceiling cans. Be warned that a great deal of sound will travel through these thin metal cans. What can be done?

Generally, the best method of encapsulating the sound coming through the can is to build a Backer Box. There are two main schools of thought on building Backer Box.

1. Cut a rectangular hole and slide a Backer Box up in the joist cavity.
2. Have a Backer Box up in the ceiling already, then drywall and cut a round hole for the light following manufacturing specifications.

Both have difficulties. However, number 2 is clearly better for drywall finishing. We will pursue that option through this guide. The trick is having the Backer Box in the ceiling while not attaching any part of the light-can to existing structure (joists).



[IB-1 Soundproofing Clips](#)  
and Drywall Furring Channel

**WARRANTY:** Because of the many installation variables beyond our control, we shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Soundproofing Company, Inc liability is expressly limited to replacement of defective goods. Any claims shall be deemed waived unless made in writing to us within thirty (30) days from the date it was or reasonably should have been discovered.

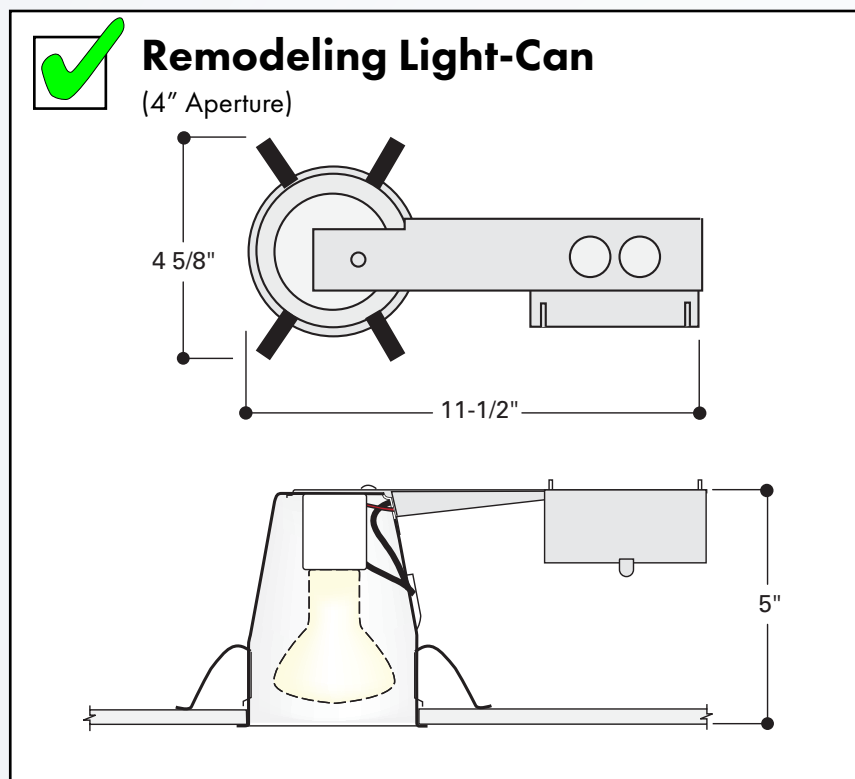
**BUILDING CODE:** The Soundproofing Company presents these construction concepts with the understanding that local Building Codes vary. It is the responsibility of the installer to ensure that these concepts meet local Building Code. The Soundproofing Company is not liable for mis-installation or non-compliance with local code.



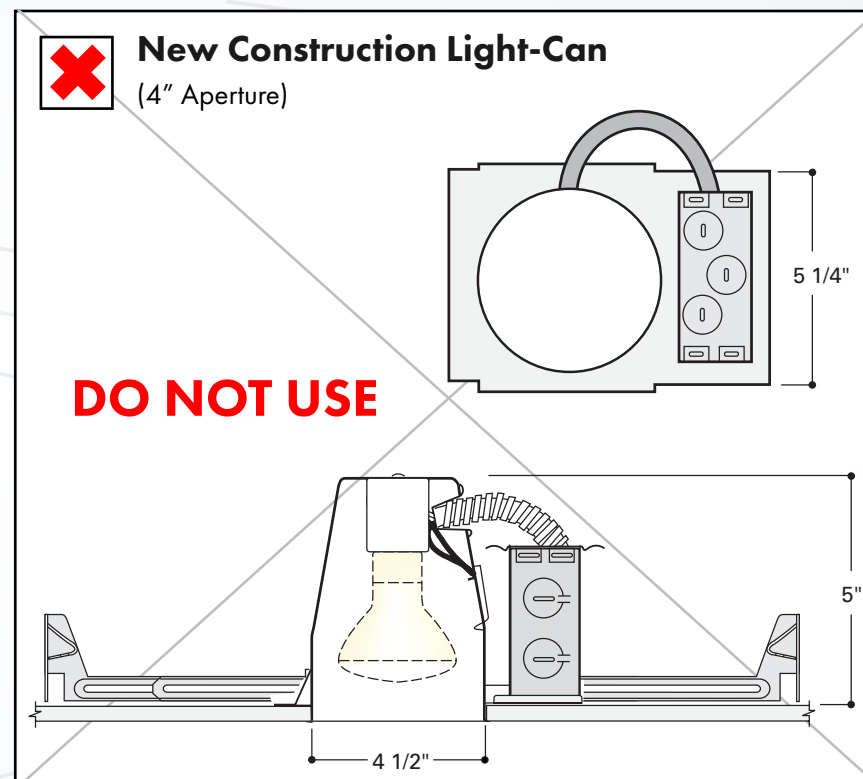
## LIGHTING SELECTION

Use a remodel light-can rather than a new construction light-can.

Use the smallest diameter light-can available. This generally is 3-4" in diameter.



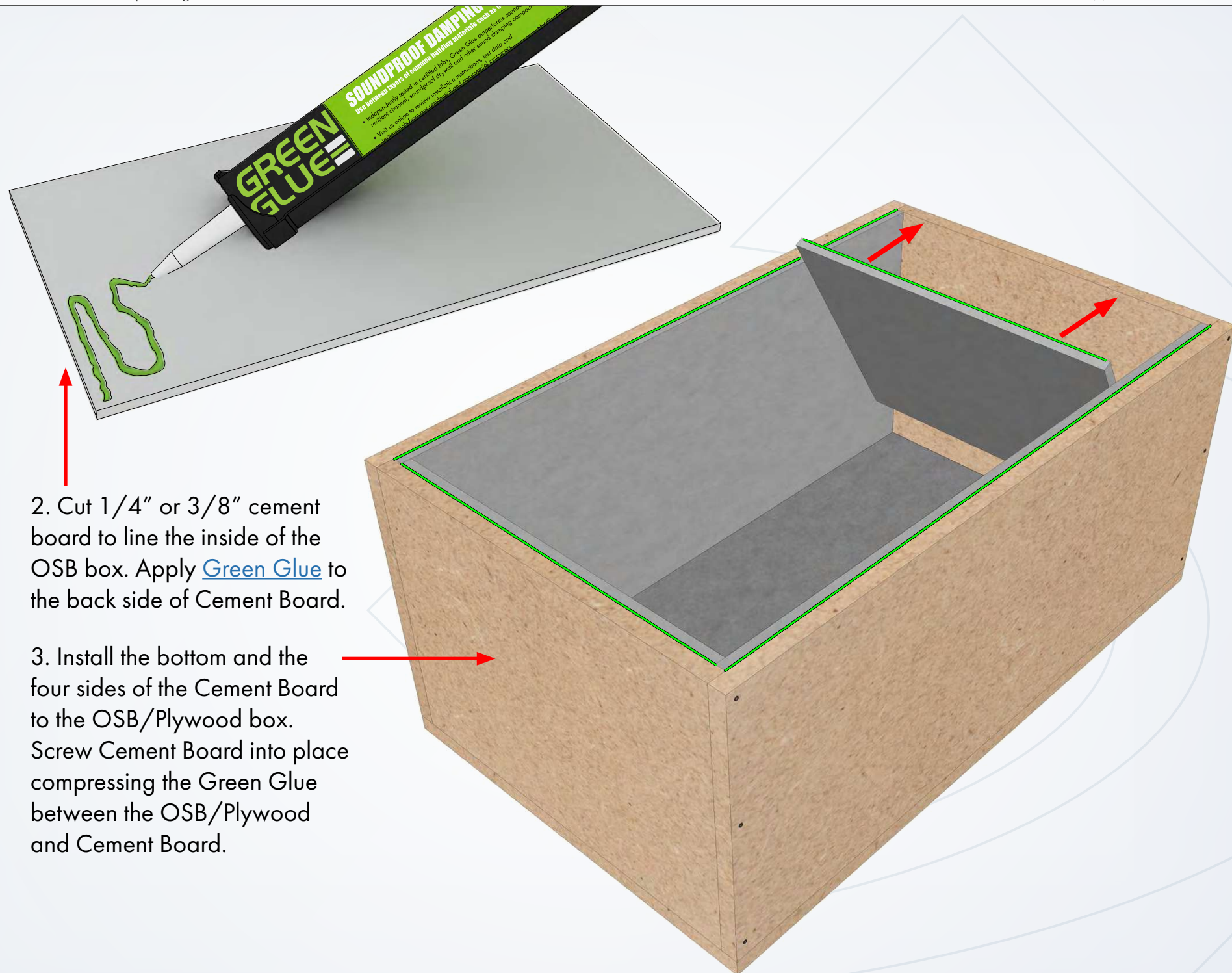
The remodel light-can will be attached to the drywall. The Backer Box will be sealed to the top surface of the ceiling drywall, eliminating any flanking path.



The telescoping arms of the New Construction Light-Can will allow sound to travel into the ceiling joists. We want to avoid this.



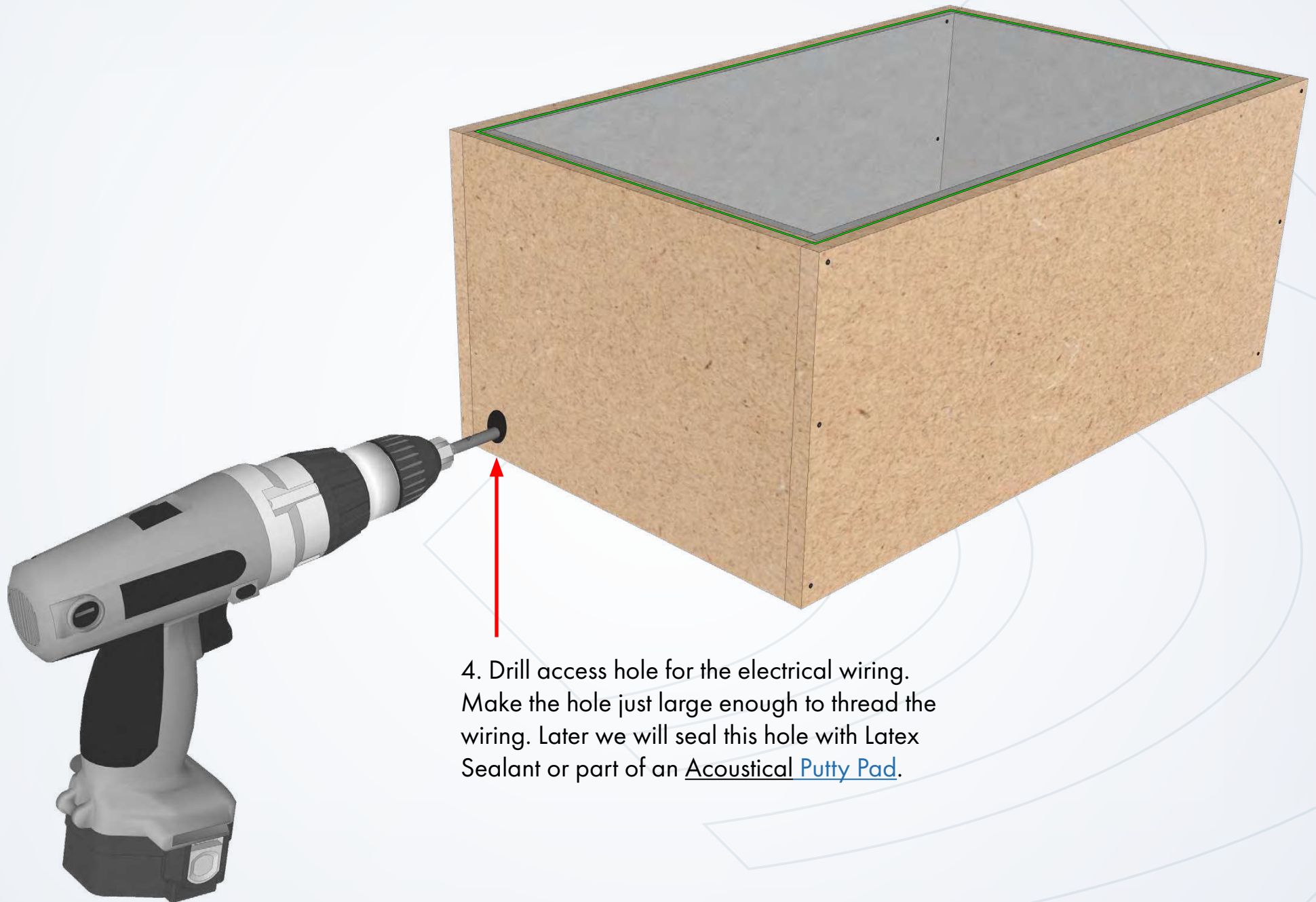
1. Build the outside of the backerbox first using 7/16" OSB or plywood. Screw the panels together.



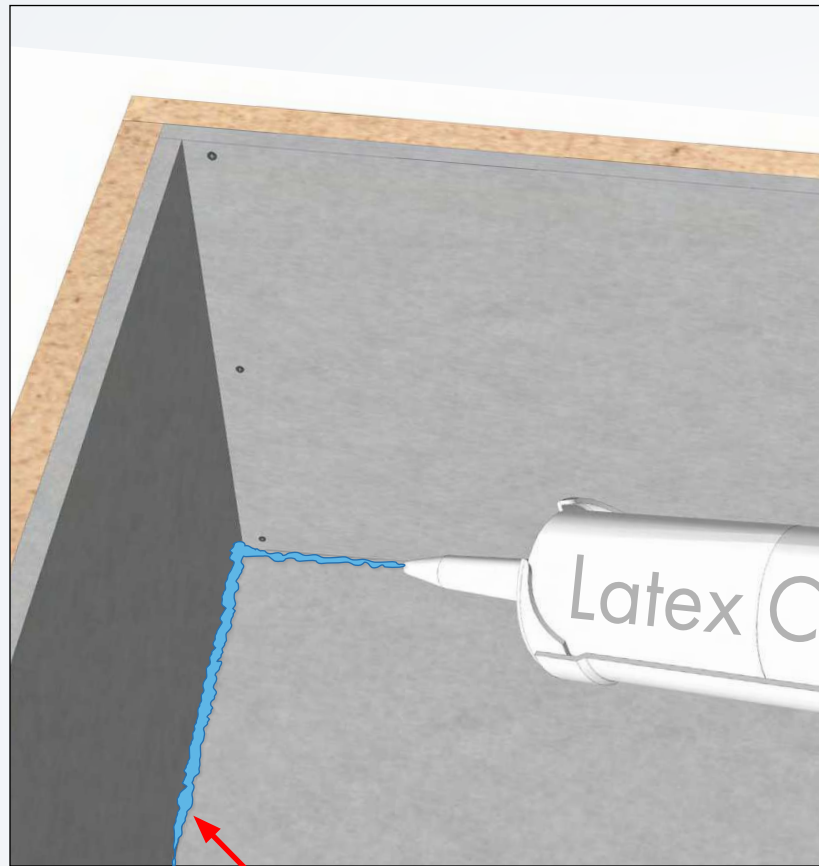
2. Cut 1/4" or 3/8" cement board to line the inside of the OSB box. Apply [Green Glue](#) to the back side of Cement Board.

3. Install the bottom and the four sides of the Cement Board to the OSB/Plywood box. Screw Cement Board into place compressing the Green Glue between the OSB/Plywood and Cement Board.





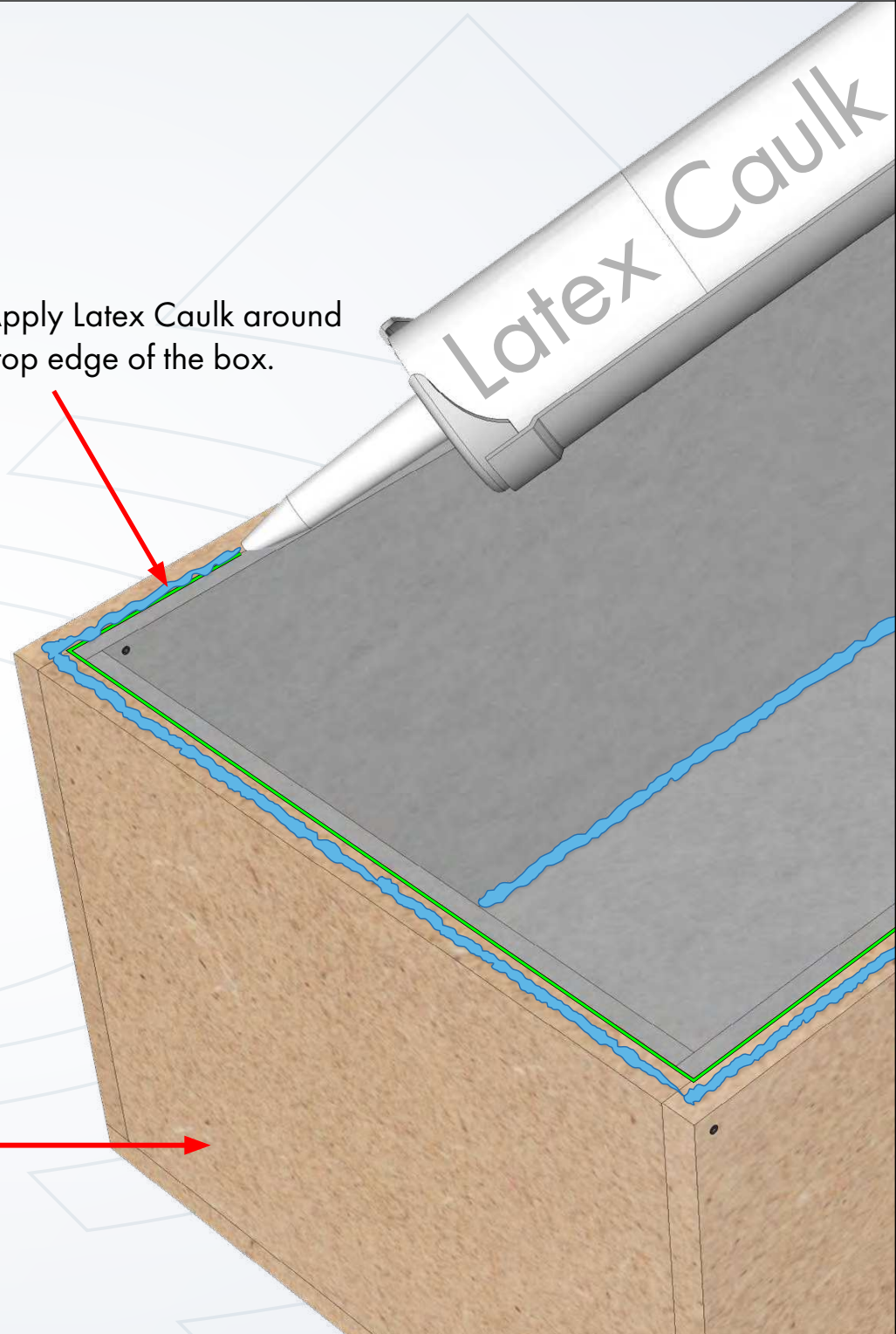
4. Drill access hole for the electrical wiring. Make the hole just large enough to thread the wiring. Later we will seal this hole with Latex Sealant or part of an [Acoustical Putty Pad](#).



6. Seal the Cement Board edges with Latex caulk.

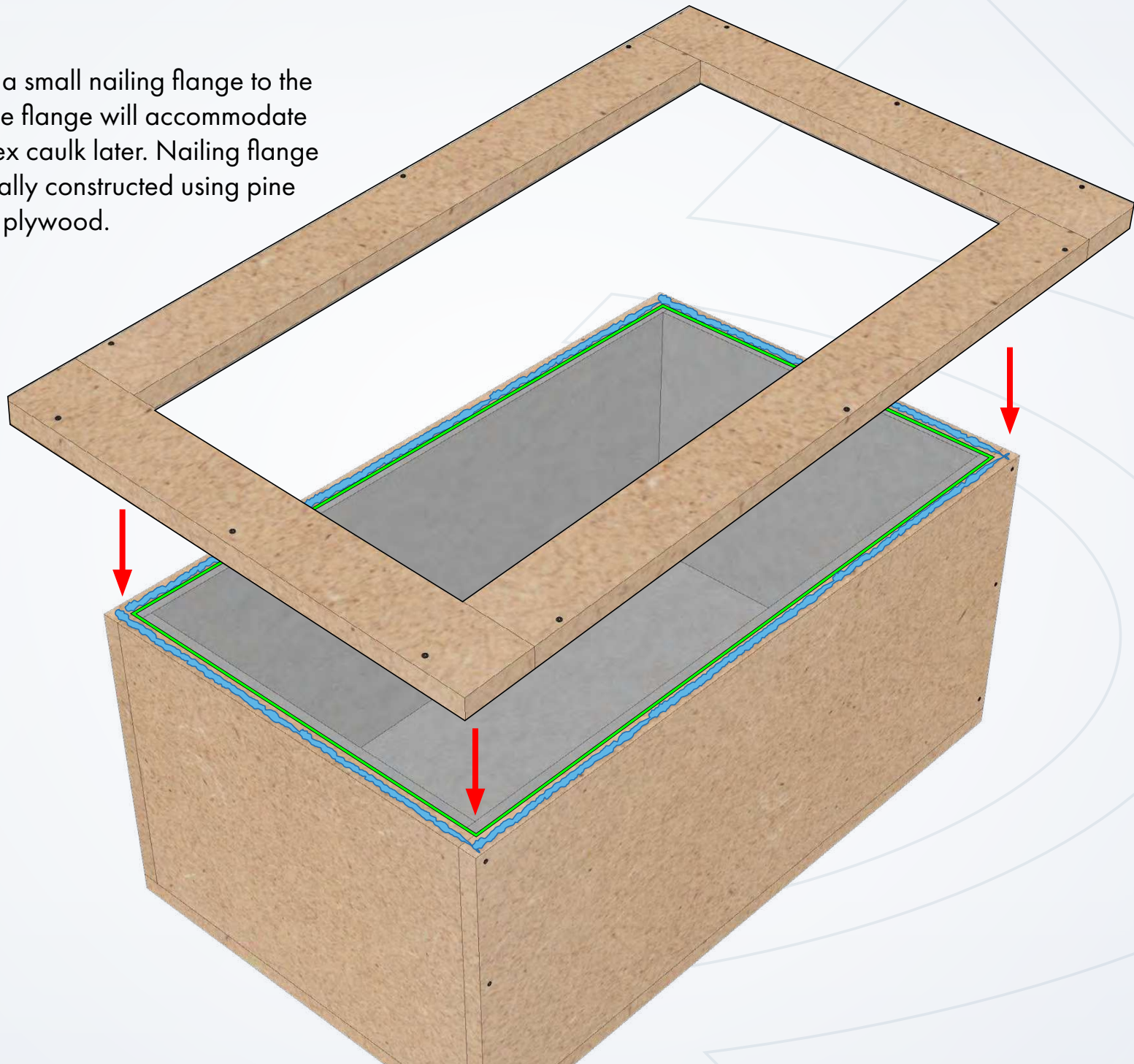
5. Apply Latex Caulk around the top edge of the box.

Backer Box



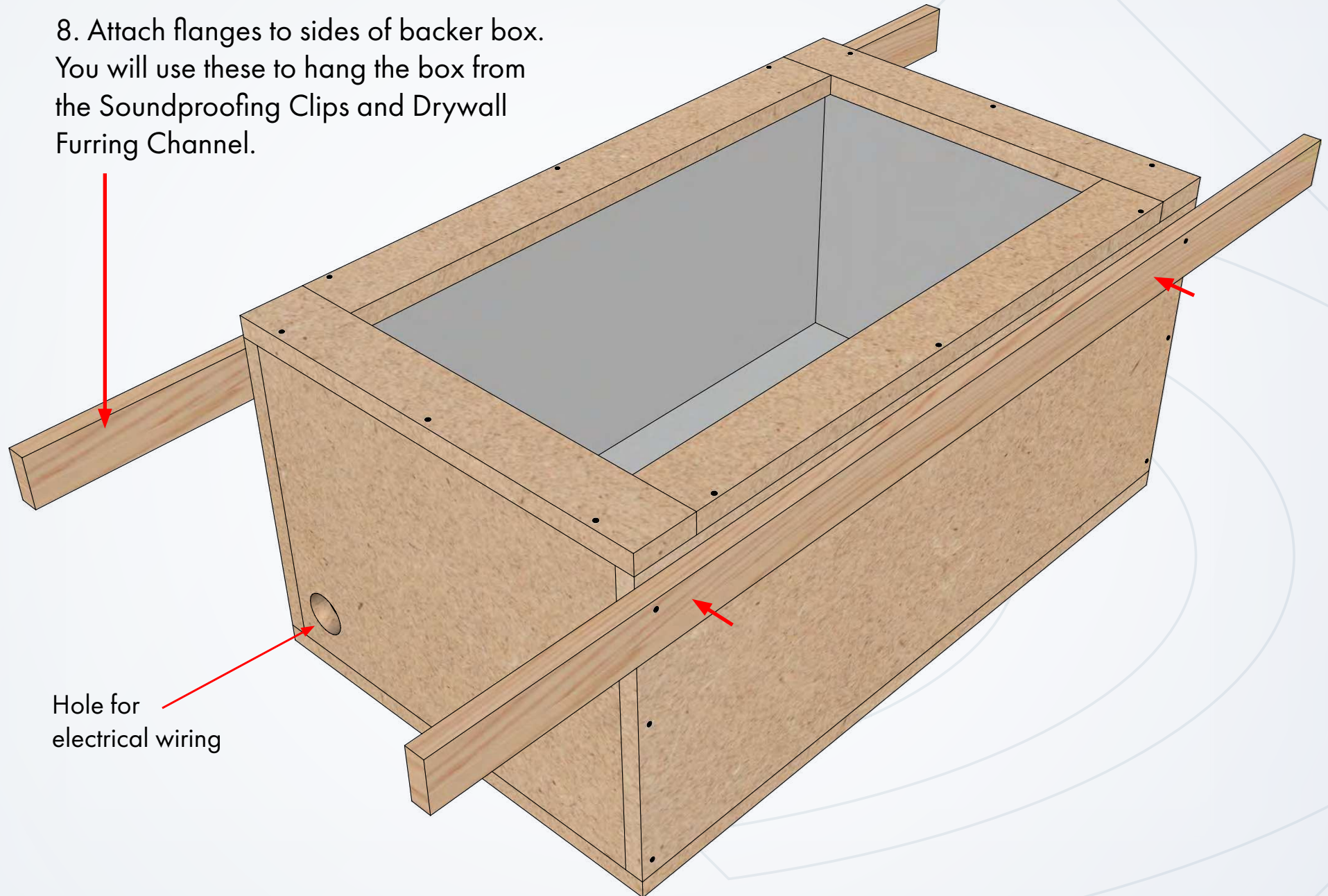


7. Add a small nailing flange to the box. The flange will accommodate the Latex caulk later. Nailing flange is typically constructed using pine or with plywood.



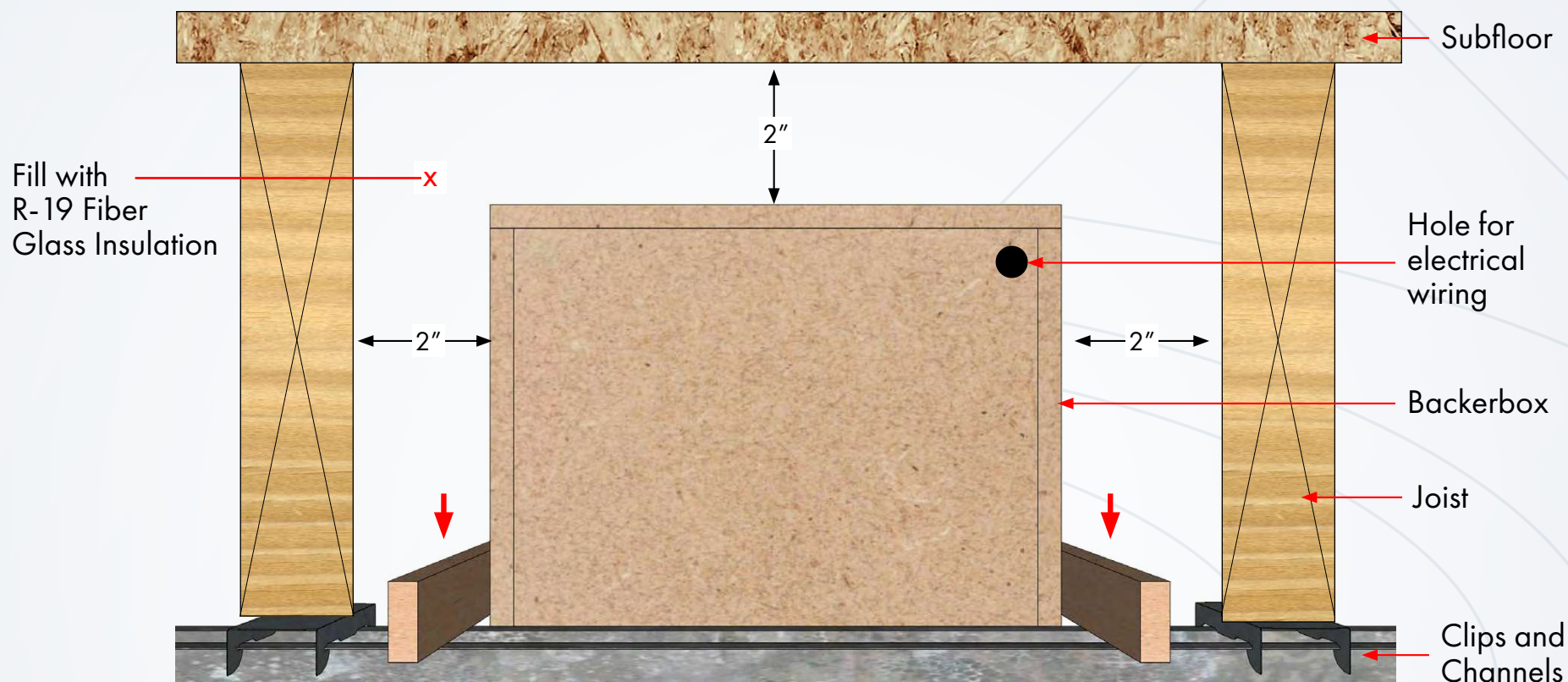


8. Attach flanges to sides of backer box.  
You will use these to hang the box from  
the Soundproofing Clips and Drywall  
Furring Channel.



Hole for  
electrical wiring

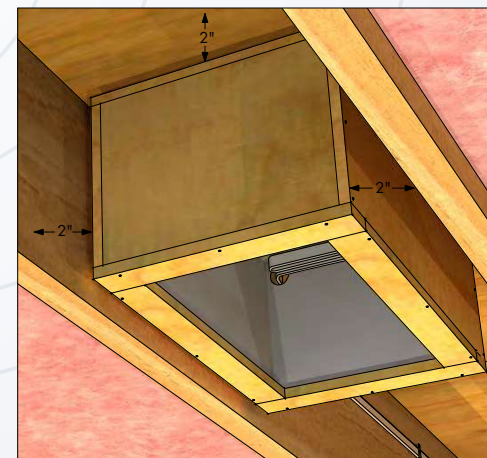
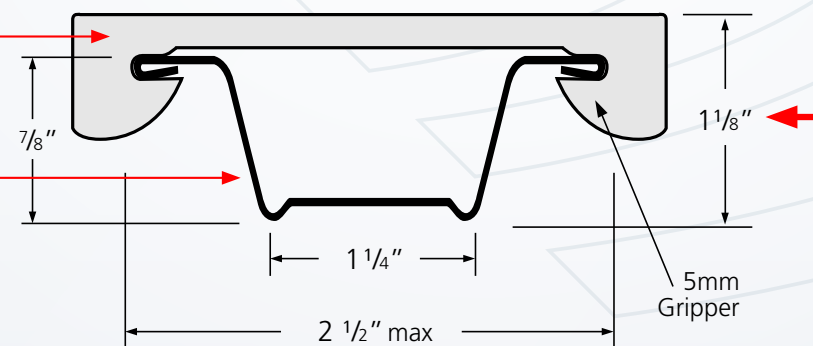
## FRONT PROFILE



9. The Backer Box cannot contact any original framing, pipe, duct, etc.

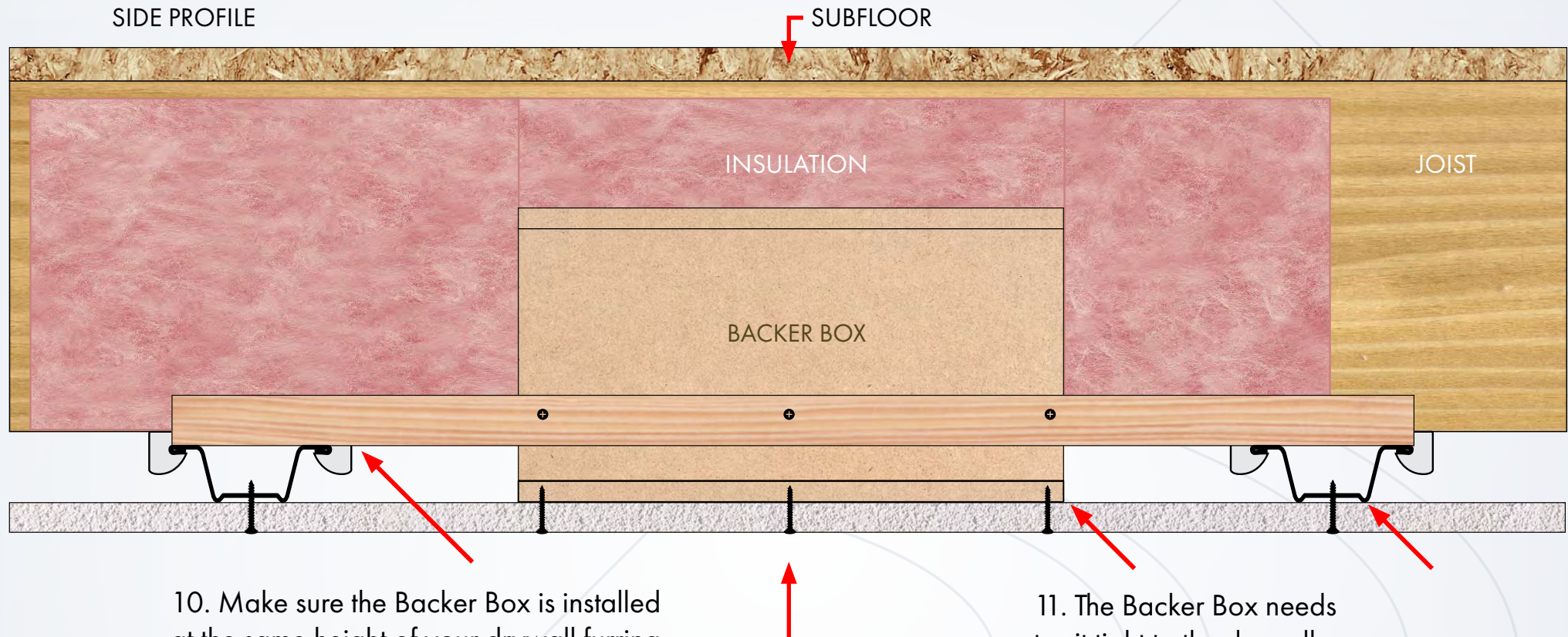
IB-1 Clip

Drywall Furring Channel



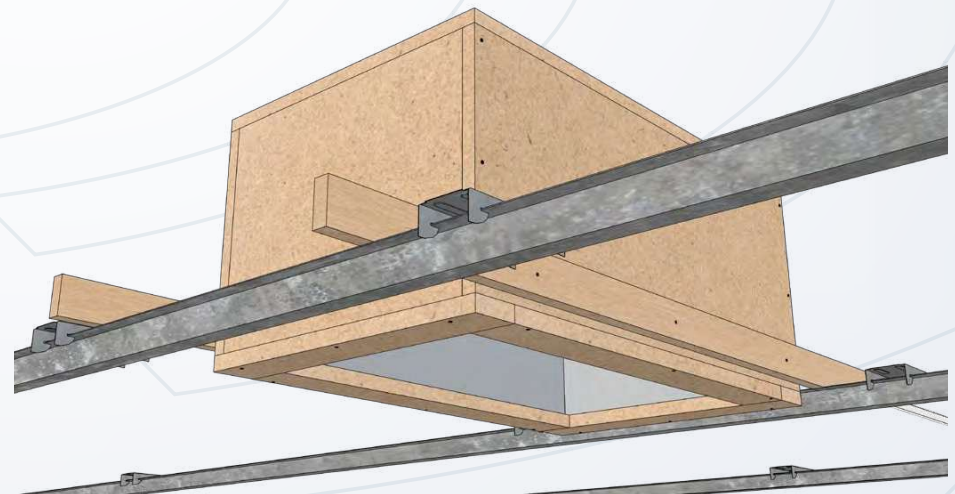
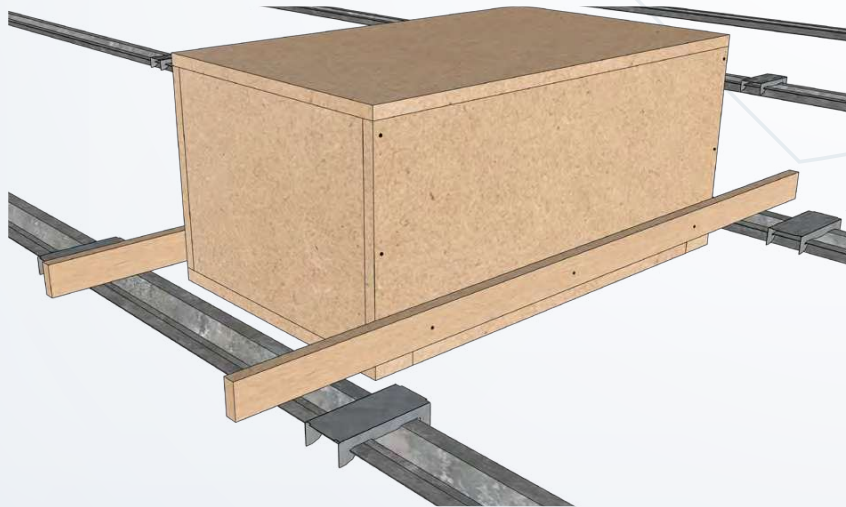


## SIDE PROFILE

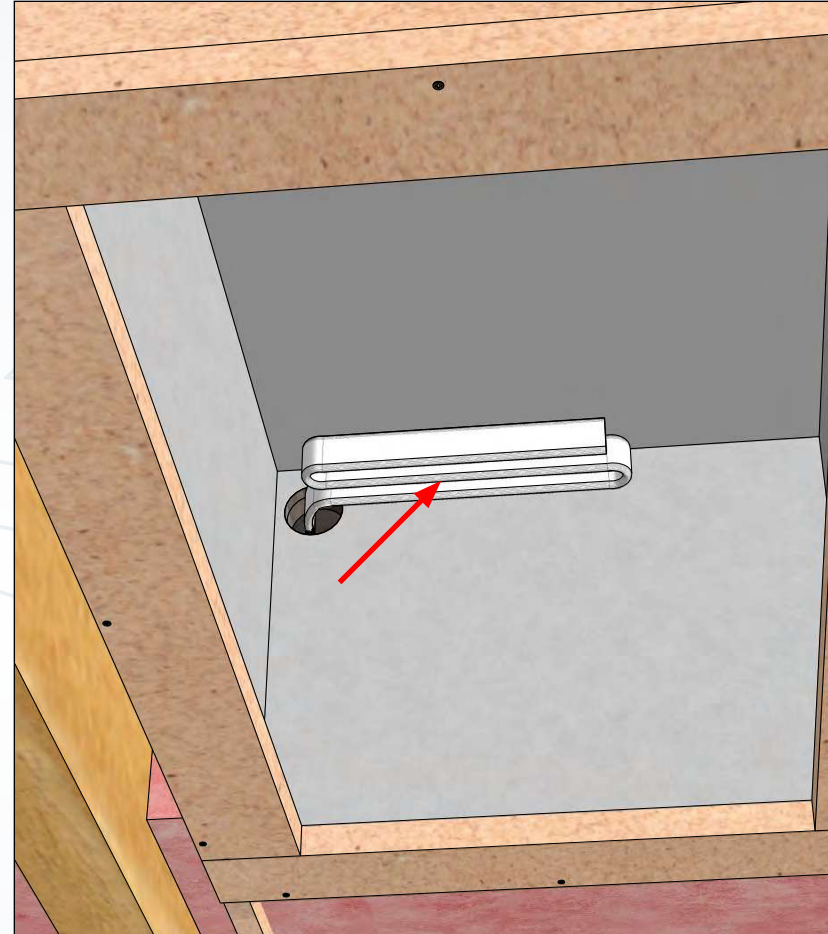
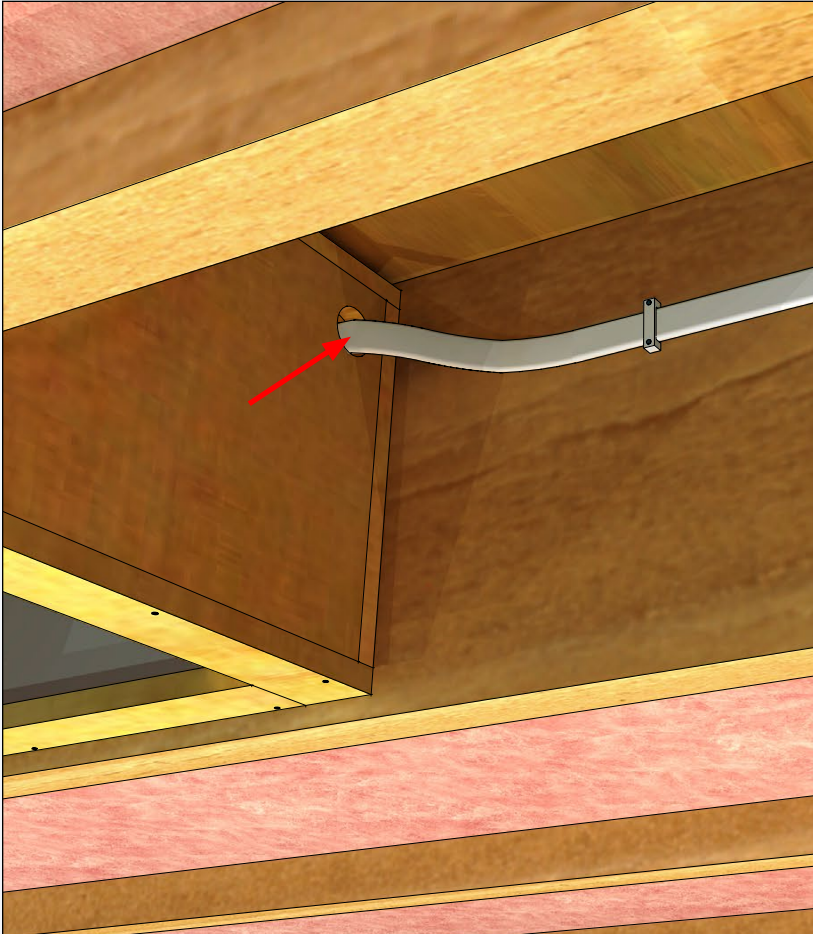


10. Make sure the Backer Box is installed at the same height of your drywall furring channel.

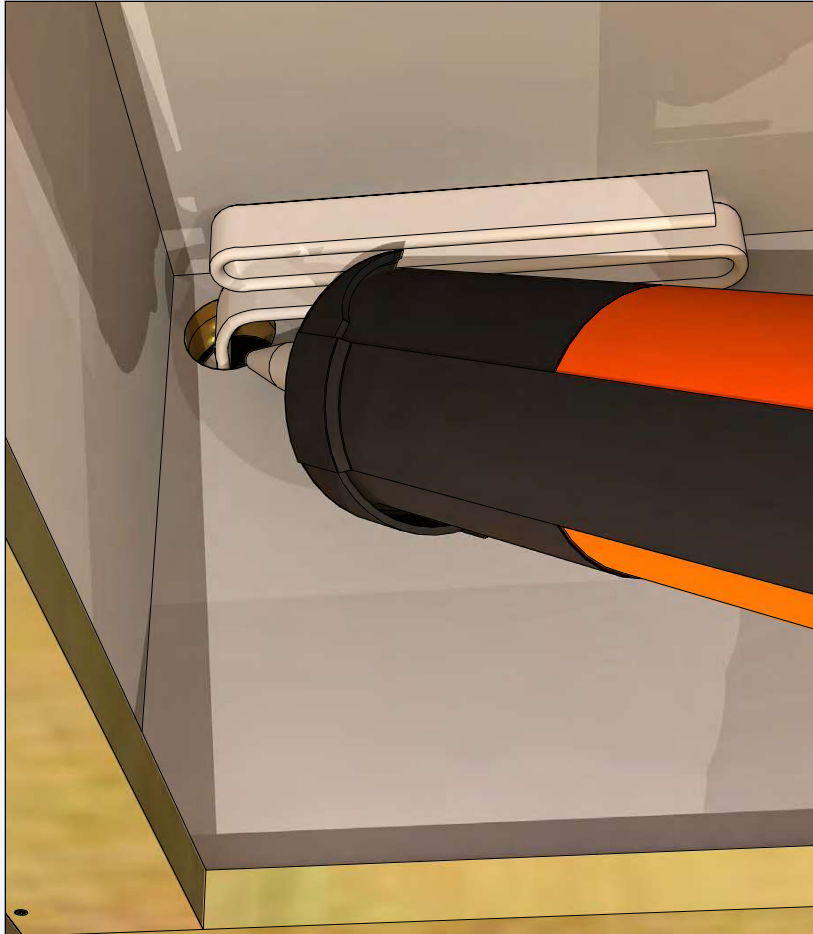
11. The Backer Box needs to sit tight to the drywall.



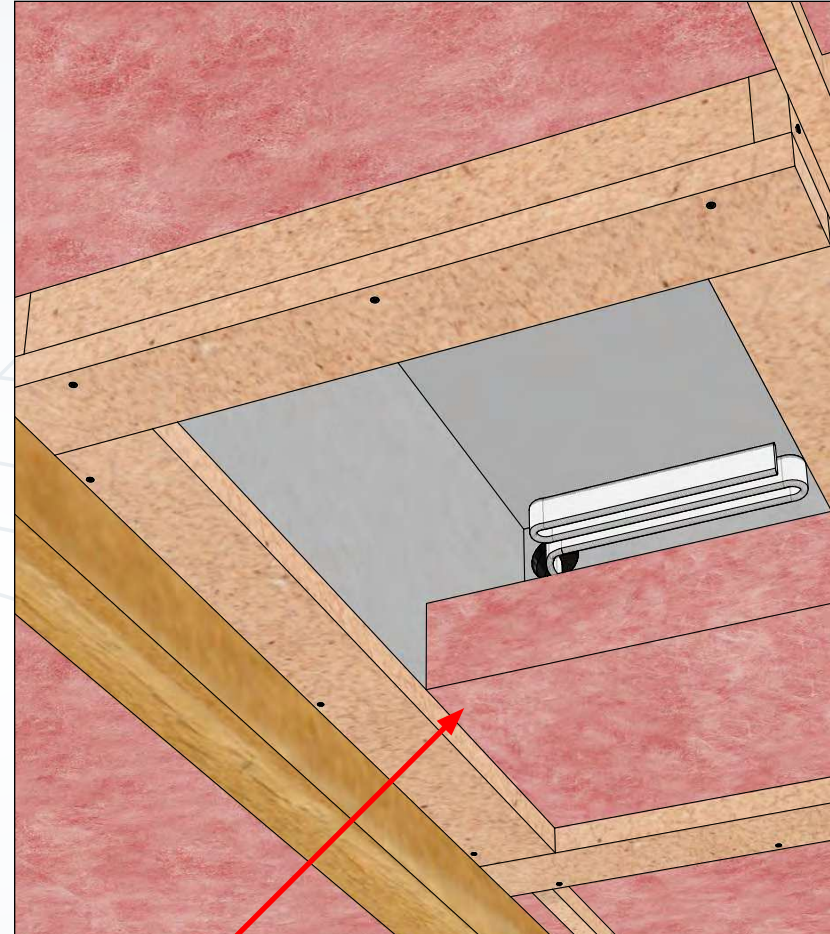




12. Run electrical wire according to local building codes. Leave the wire 24" longer than necessary inside the box. Bend the wires so the wires won't slip back through the hole in the box. The wires are now temporarily holding the box in place in the joist cavity.

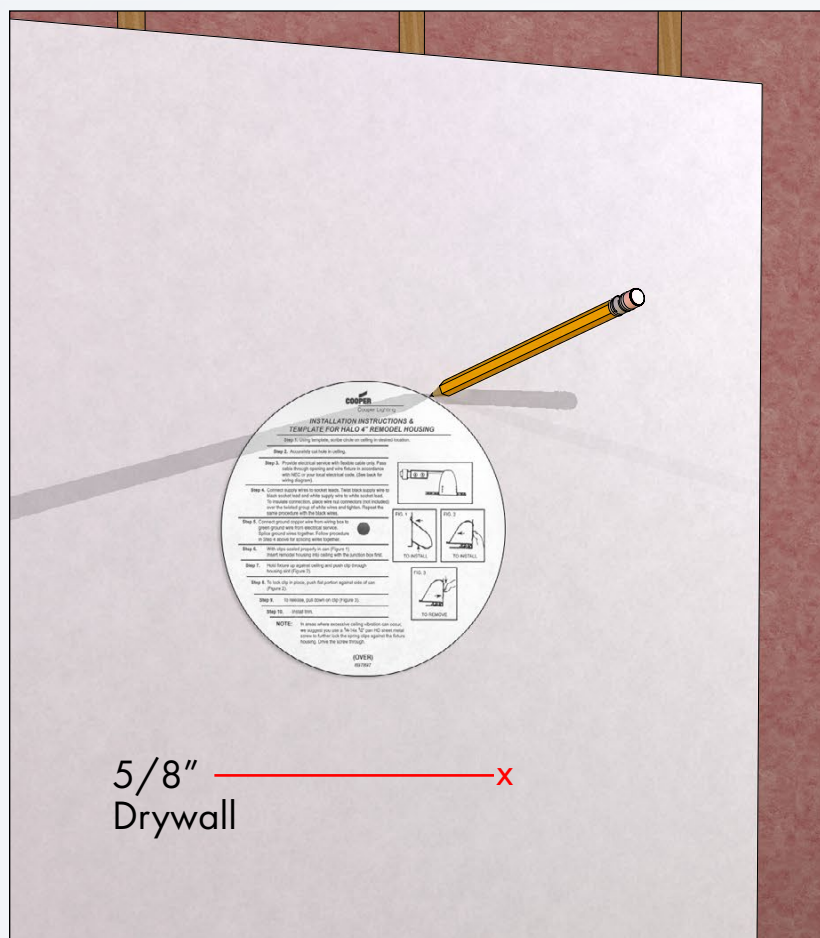


13. Seal the hole where the wire enters the box with Latex Caulk or part of an [Acoustical Putty Pad](#) (tear a corner off and fill the whole).

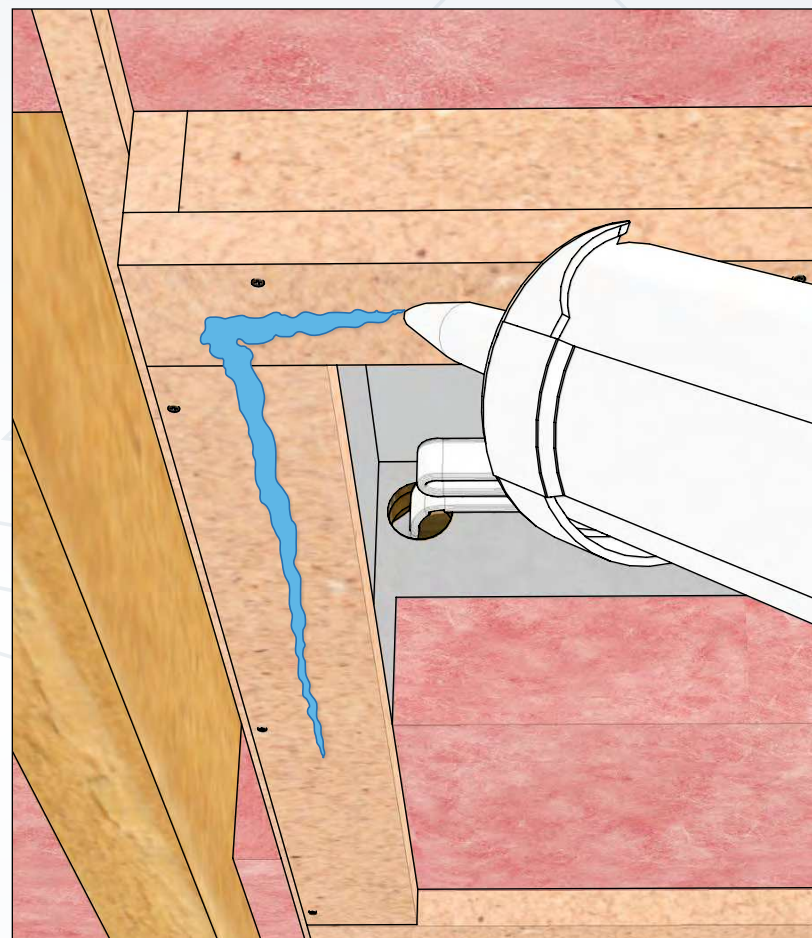


14. Add a small amount of fiberglass insulation (no paper face) into the box. The location isn't a concern, but some absorption in the box to reduce resonance is preferred.



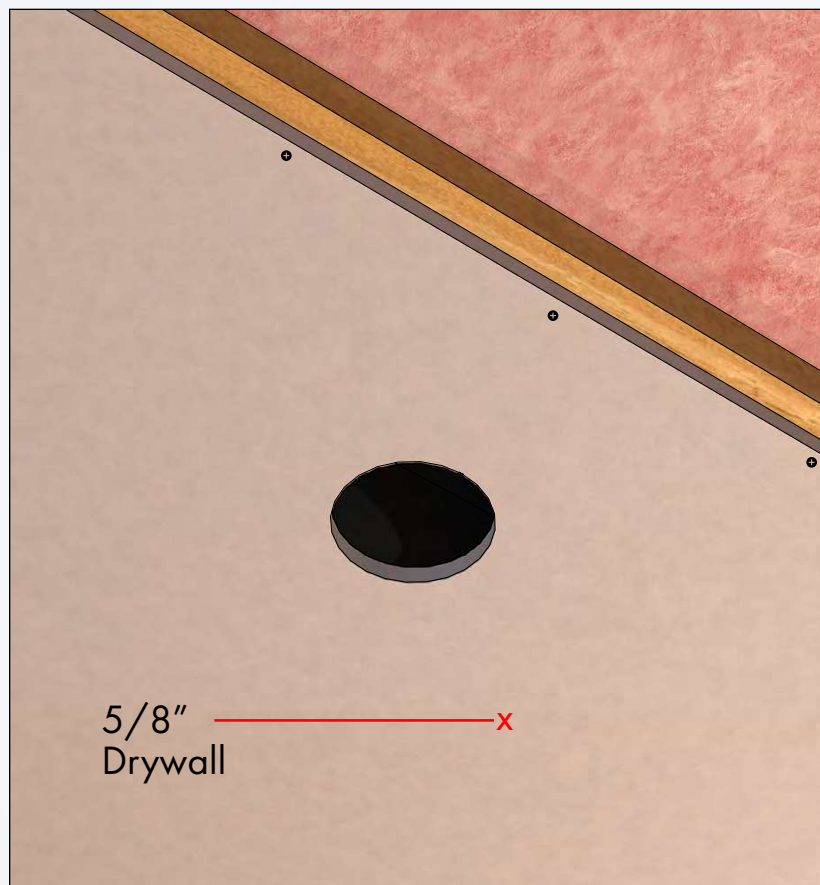


15. When you are ready to install the ceiling drywall, pre-mark the holes for the ceiling-can. Use the manufactures template to acquire a tight fit. Double check with a dry fit and then cut the hole before installing the drywall.

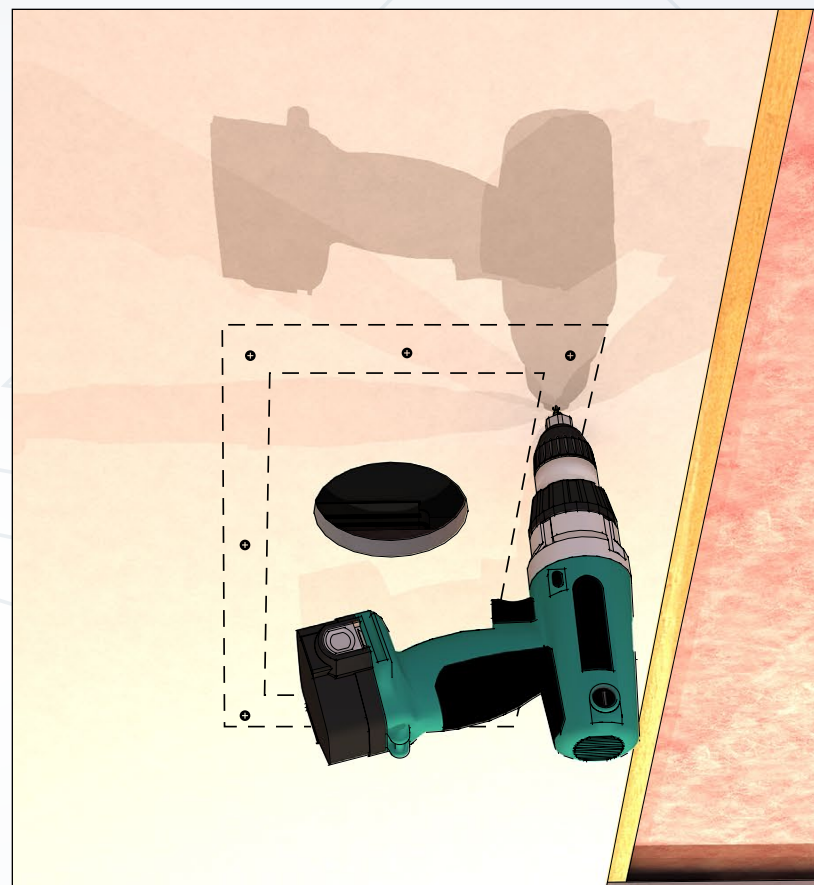


16. Apply a heavy dose of Latex Caulk to the bottom of the Backer Box flange before installing drywall.

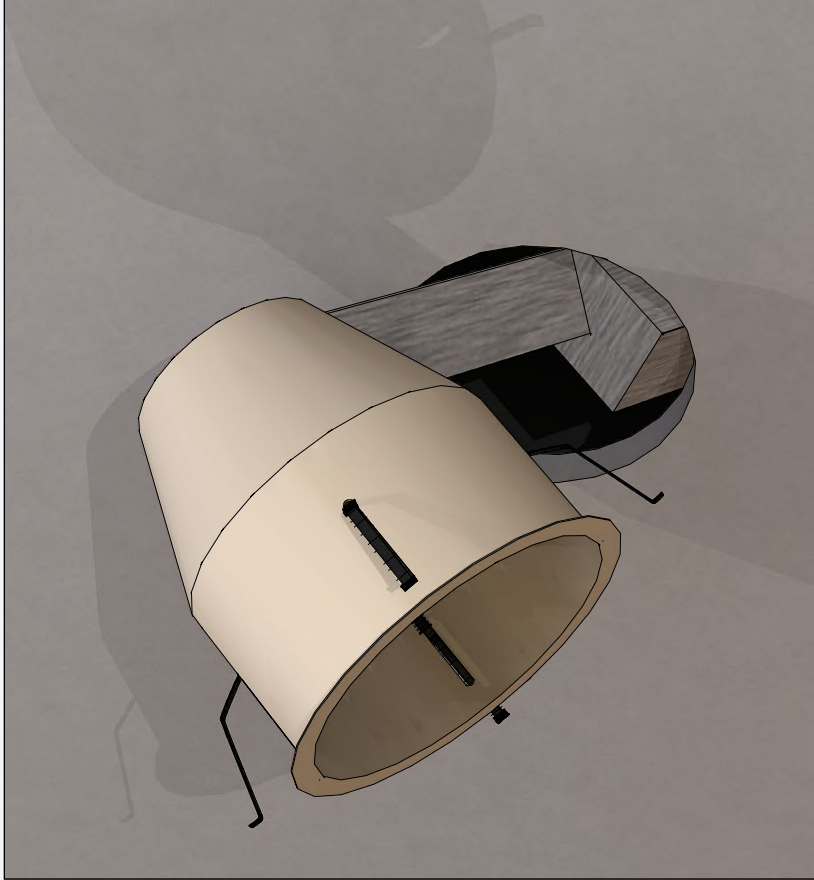




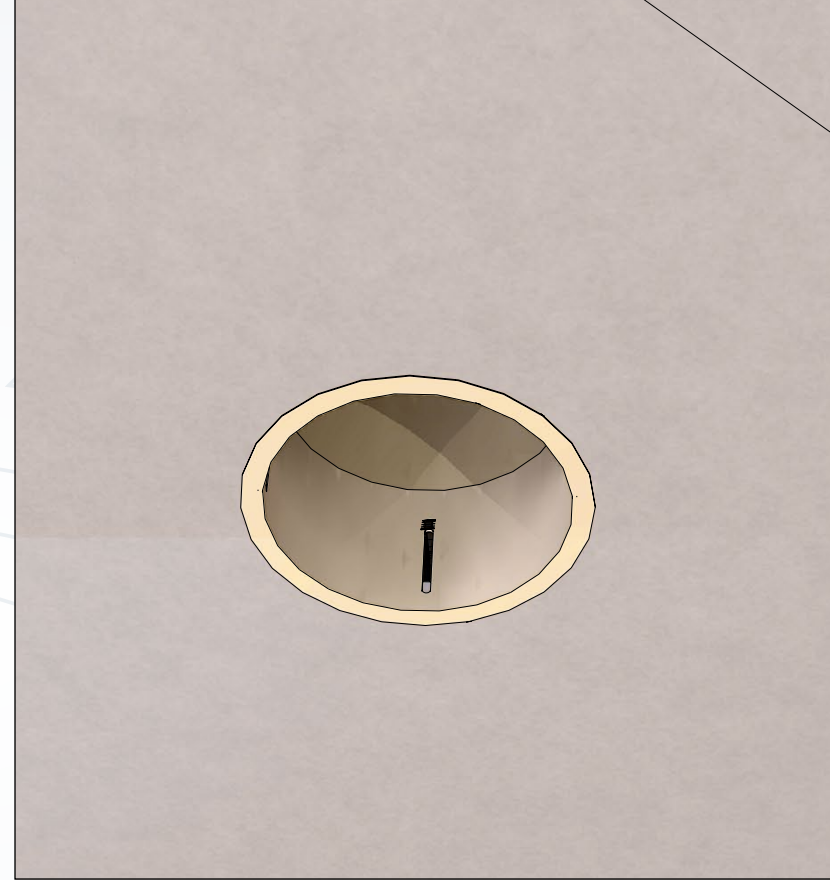
17. Adjust the final Backer Box location. You should easily be able to move the box where it needs to go (you have 24" of extra wire to adjust the Backer Box).



18. Secure the Backer Box flange with drywall screws. This will securely seal the Backer Box to the ceiling drywall.



19. Connect electrical wiring to light-can's junction box. Follow manufactures specifications for installation. With remodeling clips seated properly in can, insert the junction box into the Backer Box.



20. Hold light fixture against ceiling and push clips through the drywall hole. Lock clips into place by pushing flat portion against side of can (depending model). After drywall is finished and painted, install trim kit and bulb.

Note: Backer Boxes can also be used for in-wall speakers, wall sconces and multi-gang outlets.





## Backer Box Product Overview



Ted White from Soundproofing Company helped develop this highly specialized polymer solutions in 2003! Setting the standard since 1999.

GREEN GLUE COMPOUND



IB-1 SOUNDPROOFING CLIP

BUY  
LOCAL

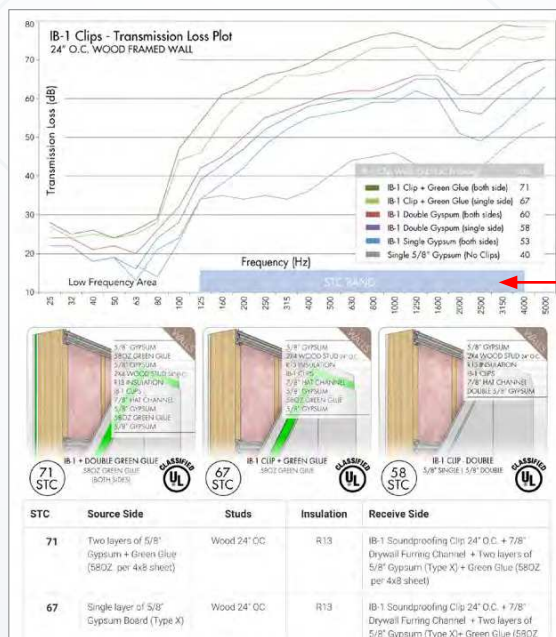


12' DRYWALL FURRING CHANNEL



SPEEDLOAD DISPENSER GUN

The Soundproofing Company wants to make sure your job is done right the first time; that's why it's important that we talk before you choose your products. These consultations are part of our service and are offered at no cost to you. We have the lab reports, materials, diagrams, SIM (Soundproofing Installation Manuals), and experience you need.



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