

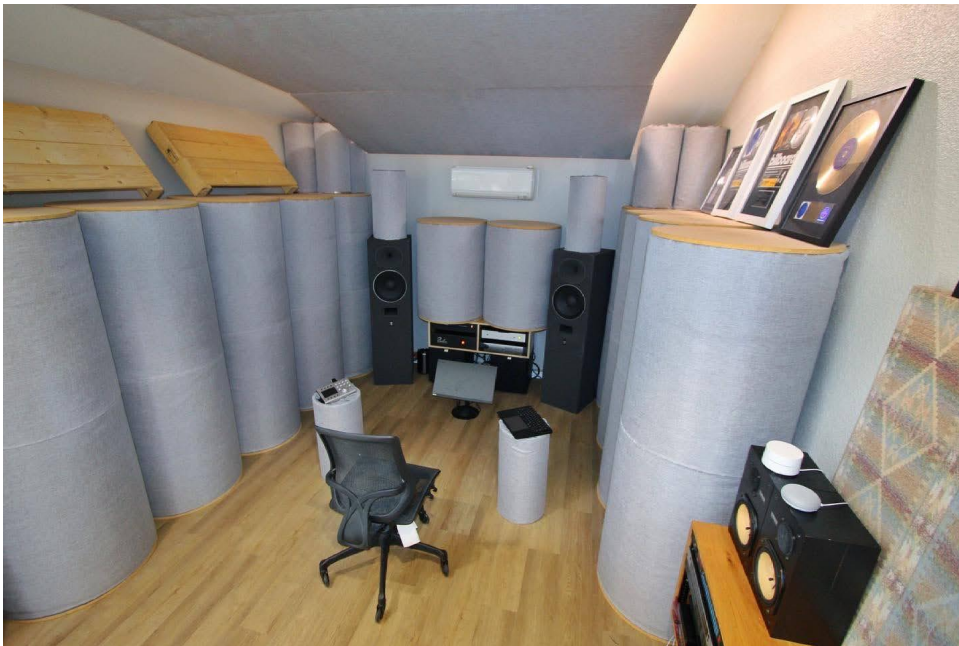


# MIXLAND

<https://www.mixland.io/>

## Holy Cannoli, it's Jesse Ray's DIY tube trap build guide!

v1.1



In this guide, I'll give you the step-by-step process on how to build tube traps. These are essentially just super large cylindrical pieces of fiberglass pipe insulation, stuffed full of fiberglass or rockwool, capped on the tops and bottoms, and then wrapped in fabric of your choice. You also have the option of adding a perforated vinyl diffusion layer to one half of the hemisphere (to provide diffusion back into the acoustic space), and a chicken-wire exoskeleton to allow for additional structural stability if desired.

Are these the **ultimate** solution for studio acoustics? I would argue that it's one of the most easily-transportable and effective approaches to outfitting an accurate listening environment. These are easy and affordable to make, they do a great job at cutting down resonances and imbalances down to about 60hz, and the tubes can be transported, reconfigured, reused, and moved many times without bearing the painful expense of starting from scratch on a costly studio build whenever you have to relocate your workspace. With that being said, it's my (limited) understanding that, due to physical limitations, 703-based material traps just simply won't ever perform quite as well as some of the more advanced membrane-based designs (such as diaphragmatic, limp mass, VPR etc). Those designs are often purpose-built and extremely heavy, making them highly unlikely to be used again at a second location. So for me, the tubes are an easy winner!

## **Brief introductory summary of layers/steps:**

### **1) Lids/End Caps**

-Wooden circles made of wood; Intended to seal the tube traps shut.

### **2) Pipe Insulation tube**

-Fiberglass Pipe Insulation tube, glued shut

### **3) Perforated Vinyl Diffusion Layer**

-This is a perforated layer of reflective vinyl that gets wrapped around half of the hemisphere of the tube. This provides a bit of natural reflection/diffusion and can make the tubes very flexible for dialing in the amount of 'deadness' in the room by simply rotating the tubes.

### **4) Fiberglass (or Polyester) Veil Wrap**

-This is an important layer that helps to contain all harmful fiberglass particles and prevent them from sneaking through the fabric and into your lungs and onto your precious sensitive skin.

### **5) Isothermal Element**

-The 'isothermal element' is essentially just loose fiberglass batting insulation that is inserted into the tubes. This creates more resistance to soundwaves and helps to convert the sound energy into heat.

### **6) Chicken-wire Mesh**

-This is purely to stabilize the tubes and make them more solid. *(I skipped this step personally!)*

### **7) Fabric!**

-Choose fabric of your choice! You can pre-sew fabric condoms that are sized out, or you can T-Pin the fabric to the tubes while pulling tightly (I chose this route for ease)

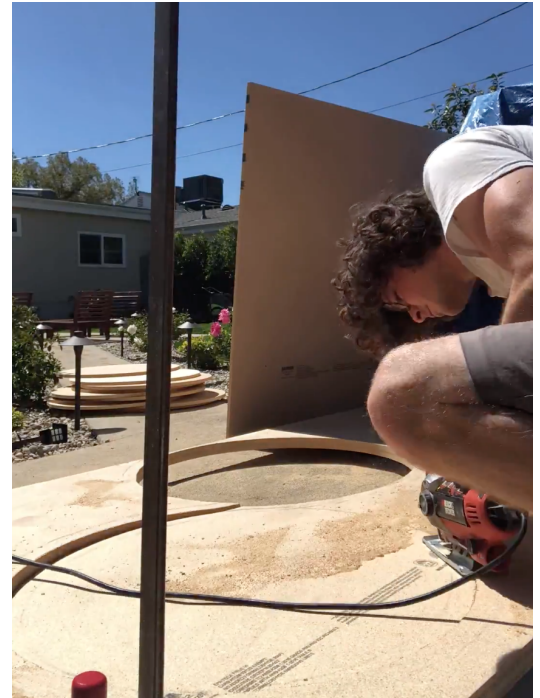
# Deeper Dive Breakdown

## Wood Endcaps:

Big 3/4" deep. Circles.

Use MDF or LDF as long as they are formaldehyde-free, otherwise buy an off-gassing product (such as Safecoat Safe Seal) or just use pine/birch.

Use a protractor to draw the template for your first lid, and then you can use that lid as the stencil to trace the outlines of all future lid cuts. I attempted to use a router with a circle-tool, for my first lid, and it took an enormous amount of time.



Instead, a jigsaw did the trick quite nicely!

A 'popular company' claims that the tubes and lid need to be completely sealed with a 100% air tight fit with no fabric or material in between; I respect the claim, but I believe this to be untrue. I measured the response of both scenarios and the findings were virtually identical... put the lids on and call it a day! (I just put the excess fabric down into the tube, and then simply set the lid right up on top of that).

## Pipe Insulation:

Would you believe that these massive tubes are actually just glorified chunks of tube insulation.. Yeah! I have a fantastic supplier that I go through for these, and his email is [d.morgan@distributionintl.com](mailto:d.morgan@distributionintl.com) (tell him I sent you!).

Orders through Dist. Intl are a minimum of 60ft, and they come in 3ft sections. I ordered 90ft and chose to glue two sections together at a time to make 6ft tall traps.)

They list the size of these tubes **rated for the size of pipe that they fit**; this means that you have to add/account for the width of the tube's walls (example: **a 24" pipe insulation tube is actually 27" because it is 1 1/2" thick!!**). Keep this in mind when measuring your room for tube traps.

I used non-shrinking DAP caulk to glue the traps together, and it worked great! Use the dap to glue the bottom lids to the tube traps as well (leave the tops open for now).





### **(Optional) Monitor Stands:**

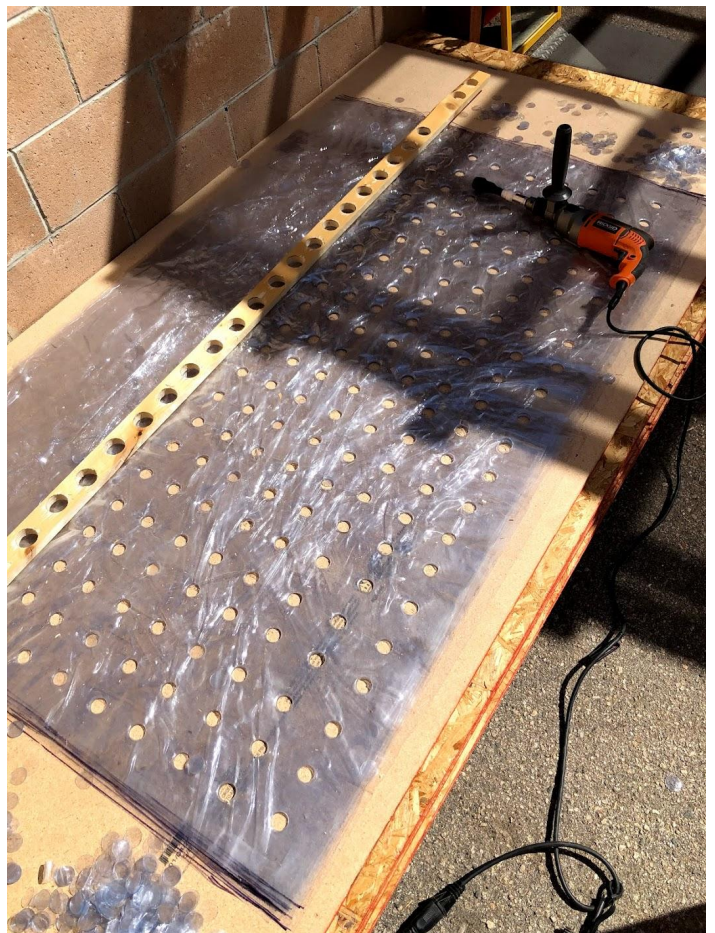
If you are devising this attack wall setup for use with nearfields, you may want to measure and cut a few tubes to act as your monitor stands (and the speakers will sit, sandwiched in between the top and bottom tube). *The standard ASC sizes for Monitor Tops is 18" and Bottoms are 42".*

*(No Diffuser sheet for monitor stands FYI)*

### **Vinyl Diffuser Sheet**

I bought the following roll of vinyl for constructing the vinyl diffusion layer:

*Thickness / gauge = .0120" (1/64")  
(.31mm) = 10mils [10 mils = 0.010"]*



<https://www.marinevinylfabric.com/products/clear-marine-vinyl?variant=32074903257172>

It's important to perforate the vinyl (punch holes or slats) into the vinyl to make it a bit more breathable, so the upper frequencies can pass through. I used this tool attached to a drill to drill through all 30 sheets of vinyl at one time:

[https://www.amazon.com/General-Tools-1271M-Arch-Punch/dp/B00004T7WH/ref=sr\\_1\\_4?crd=3L6B72AFOYGP2&keywords=hammer+hole+punch&qid=1661708294&srefix=hammer+hole+punc%2Caps%2C142&sr=8-4](https://www.amazon.com/General-Tools-1271M-Arch-Punch/dp/B00004T7WH/ref=sr_1_4?crd=3L6B72AFOYGP2&keywords=hammer+hole+punch&qid=1661708294&srefix=hammer+hole+punc%2Caps%2C142&sr=8-4)

The vinyl can be attached by use of glue, staples, or t-pins to the insulation (the vinyl really helps with attaching fabric to the tubes later on, and provides a nice diffusion to the sound in the space). *(I use the diffusion side facing away from me in my mix room, FYI. I've found that the effects of the diffusion are very very subtle).*

### Fiberglass Tissue Veil

It's incredibly important to trap/lock the harmful shards of fiberglass into the trap, so they are contained and cannot escape into the airflow of your room. These are cancer-causing.. Keep your clients and family safe!

I applied the veil layer over the diffusion layer, just like 'a popular tube trap manufacturer' does, and I used the following polyester quilt batting that matched the dimensions of my 6ft x 27" tubes:

[https://www.amazon.com/gp/product/B00114ORI0/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o01\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B00114ORI0/ref=ppx_yo_dt_b_asin_title_o01_s00?ie=UTF8&psc=1)



Use the following formula to calculate the amount you'll need:

$$\text{Circumference} = 2\pi R$$

If you're looking to keep the specs as close to 'the big name product', then you'll want to search for the following:

Continuous Strand Veil Surfacing Mat

Look for 3/4 ounce weight

*FiberGlast - 260H Continuous strand Veil surfacing mat.*

Non-woven mats, also known as Surfacing Veils, are lightweight reinforcements made from randomly dispersed glass or polyester fibers and bonded into a thin sheet.

*These can only be glued with Polyester or vinyl ester resins !!!*

### **Isothermal Element:**

Arguably the most important part of the entire design: the isothermal element! This is essentially loose fiberglass batting insulation that creates friction, and helps to break down more of the sound wave energy into heat. If you geek out on math and numbers, then you'll love this next part. For me personally, I just loosely filled the tubes full of the batting insulation and called it a day! If you have more ambition than I did, here is the general scientific formula for calculating the amount of isothermal stuffing to apply into teach tube trap:

VOLUME OF TRAPS / .5lbs/cuft of isothermal stuffing

$$\text{Volume of cylinder: } V = \pi R^2 H$$

*Cubic Inches to Cubic Feet conversion:  $V \div 1728 = \text{cuft}$*

*Remember! = subtract 1.5" from the radius to compensate for the wall thickness. The internal cavity is 3" less in diameter = 1.5" less than radius.*

### **Wire Mesh:**

The wire mesh layer

*Wire Gauge = Approximately .0300" in diameter = between 21 and 23 gauge. 1/2" squares , Circumference =  $2\pi R$*

## **FABRIC:**

*I chose this fabric:*

<https://bestfabricstore.com/VINSIR.html>

*It is not stretchy but it looks close to Guilford of Maine for a fraction of the cost. I'd recommend ordering \$100 worth of samples and choosing what you like best!*

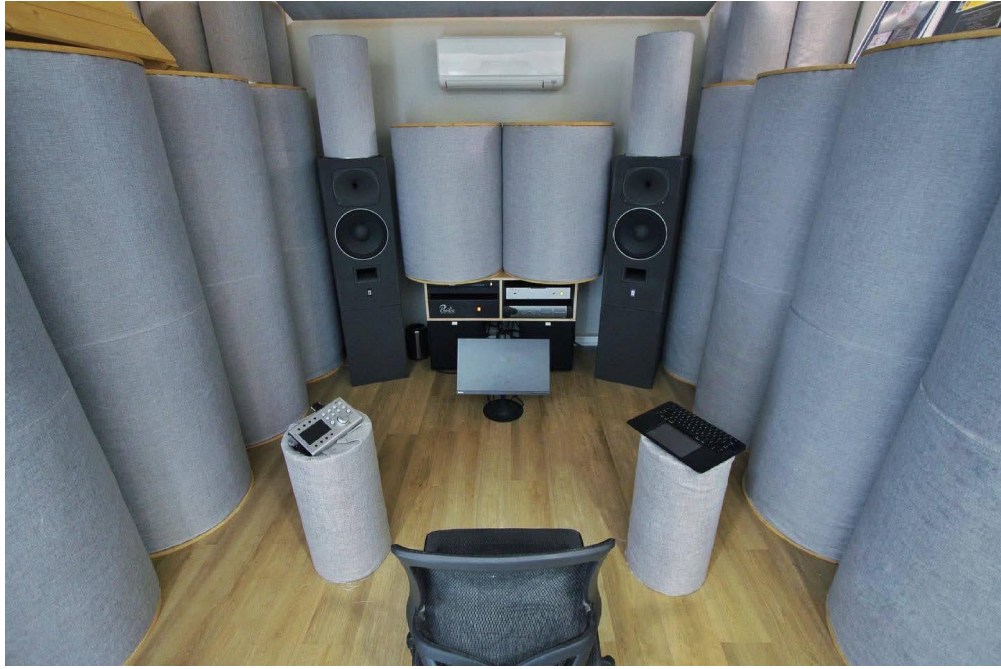
As stated above, you can attach the fabric however you prefer! Pre-sewn fabric condoms, T-pins, etc. I found that pulling/attaching the fabric using T-pins worked well. The T-pins secure in nicely through the vinyl layer on the back of the tubes.



**And there you have it! AWESOME tube traps and AWESOME sound! I hope that this guide helps you and brings value to your home studio/music room!**

**These are an extremely low-cost solution for effective control and absorption in your space. If you have any questions, comments, or feedback, please reach out to me at [mixlandaudio@gmail.com](mailto:mixlandaudio@gmail.com)!**





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