Understanding Mass Loaded Vinyl

Sound can be wonderful—think of Beethoven or birdsong. But sound we don't want to hear, in the wrong place, at the wrong time, is simply noise: a nuisance that can make life stressful and work, study, or sleep impossible. If you're plagued by a noise problem, the simplest approach is to kill the sound at its source, but sometimes that's just not an option. If you live near a construction site, a noisy bar or nightclub, or you have an elderly, forgetful neighbor who plays the TV through your wall at full blast, getting the volume turned down may be very hard work. Maybe you have the reverse problem: perhaps you have a noisy occupation or hobby—you might be a practicing musician or a DJ—and you want to spare the people around you from suffering the sounds you make. What can you do? Fortunately, there's a simple solution to most of these noise problems: Mass Loaded Vinyl.

What can I use Mass Loaded Vinyl for?

Mass loaded vinyl is a cost-effective noise solution and is one of the more versatile products on the market as far as application. It is primarily used to keep sound from penetrating through walls, ceilings and floors.

Here are some additional ways you can use MLV as a soundproofing barrier:

- To soundproof HVAC ducts and pipes
- To soundproof pumps and generators
- To Improve sound and bass in vehicles
- To block road noise and other vibrations in vehicles
- To quiet appliances such as AC units and dishwashers
- To keep sound from getting in and out of home windows and doors

Not only will MLV act as an acoustic blanket for all of these purposes, but you can also customize it to fit your specific needs thanks to its flexible nature.

What is Sound Transmission Class, and How is Mass Loaded Vinyl Rated on the STC Scale?

Sound Transmission Class, also known as STC, is a numeric value that rates how effective a material will block sound from getting through the other side. The higher the STC rating, the better the material is at soundproofing.

Here is a basic breakdown of the STC ratings and what they mean:

25-30	Normal speech can be heard and understood
30-35	Loud speech can be heard and understood
35-40	Loud speech can be heard, but not understood
40-45	Some loud speech can be heard, but not understood
45-50	Loud speech cannot be heard
50-55	Extremely loud sounds (stereo, some musical instruments) can be faintly heard
55-60+	Almost no noise detection whatsoever

The standalone STC rating for MLV (meaning before it's installed between walls, floors, etc.) varies depending on the thickness of the MLV being used. Here at Burning River Buys our standard 1/8 inch thick MLV (also known as 1 lb. vinyl) boasts a standalone rating of 26. Add it to typical ½" drywall wall assembly with an STC rating of 33, and you'll enjoy significant sound reduction.

Is Mass Loaded Vinyl Safe?

Yes, MLV is safe. It was created to be a non-toxic alternative to lead sheeting which was formally the industry standard for soundproofing. As you probably know, lead material is dangerous — especially for children — and can lead to brain damage, hyperactivity, hearing problems and a slew of other issues.

In contrast to the toxic materials in lead, MLV is made from vinyl and calcium carbonate or calcium silicate. This combination produces a superior soundproofing option without the potentially dangerous side effects of lead sheeting.

How does Mass Loaded Vinyl Work?

To understand how MLV works, we have to first understand how sound travels. Sound is produced when something vibrates. The vibrating body causes the medium (water, air, etc.) around it to vibrate. Vibrations in the air are called traveling longitudinal waves, which we can hear. Sound waves travel through air in much the same way as water waves travel through water. In fact, since water waves are easy to see and understand, they are often used as an analogy to illustrate how sound waves behave. Sound can travel through air, water, solids or any other area where the wave particles can bounce off one another.

MLV will reduce the incoming sound by blocking any direct air pathways that allow sound to travel. This is possible because of it its thick barrier mass. MLV works whether it's blocking sound from the outside coming to the inside, or the reverse - sound from your space to traveling to the outside. How you install MLV depends on whether the MLV is being applied to an existing wall or to new construction.

Methods of Installing MLV

In the case of installing to an existing wall, while it is possible to install the MLV directly on existing drywall and add another sheet of drywall directly over the MLV, though this would not be the most effective way to reduce the sound that passes through the wall. MLV is most effective when it has a slight space between it and the wall (known as decoupling) so that when sound hits it, the energy of the sound wave is transferred to the MLV, causing it to slightly vibrate, and thus reduce the strength of the sound wave that passes through it. When sandwiched directly between two pieces of drywall, the MLV is not able to slightly vibrate and move freely and absorb the energy. The vibrations convert sound energy into heat. To create that slight space (i.e., to decouple) a gap can be created by installing furring strips directly to the wall at the location of the underlying studs behind the drywall, and then attaching Soundsulate™ MLV to the furring strips and another layer of drywall over it.

In a situation where the wall studs are exposed (such as new construction), the Soundsulate™ MLV would be attached to the studs, and the drywall installed over the top of the MLV. This situation allows for the side of the MLV that attaches to the studs to slightly vibrate freely and absorb the sound waves. Add insulation where possible to reduce reverberation noise in the stud cavity

Mass Loaded Vinyl: Variations Explained

The base material of mass-loaded vinyl (MLV) is the vinyl itself. This material is known for its flexibility and versatility. It can be shaped into many forms, specifically the thin sheets that can be installed into large flat surfaces or shaped into a variety of geometries desired. However, vinyl alone is not considered a good soundproofing material. In order for a material to achieve adequate sound reflection, it needs to be dense, thus you need more mass. For improved sound blocking performance, manufacturers add inert fillers made from rock. These fillers add mass (high specific gravity), which improves the ability of the MLV to reflect sound.

There are two basic types of MLV, one that uses calcium silicate as a filler and one that uses calcium carbonate as a filler:

Polyvinyl chloride (PVC) MLV is the most common type and uses calcium silicate as the filler. PVC MLV has smooth surfaces, black or dark gray appearance throughout the material and are relatively scratch resistant. PVC is typically a rigid material and is

not flexible enough for sound control applications unless plasticizers are added. Plasticizers are petroleum distillates which are volatile organic compounds (VOC's) which are health hazards. VOC's are known to migrate out of MLV material, even at room temperature. Over the long-term VOC migration will reduce the flexibility of the material.

Ethylene vinyl acetate (EVA) MLV and **polyolefin elastomer (POE) MLV** are types that use calcium carbonate as the filler. EVA contains a minimal amount of plasticizer where POE contains zero plasticizer which allows it to stay flexible throughout the life of the product.

The appearance of EVA and POE is different than that of PVC. The EVA and POE materials are usually black on the exterior surfaces and gray on the inside due to the different filler material. This material scratches easier than the PVC but it remains durable and flexible throughout the life of the product. The EVA and POE usually have one smooth, shiny surface and one rougher, duller surface. An irregular or textured surface is advantageous as it reduces the contact area which helps reduce noise via material transmission.

It is important to note that the quality of the sound reducing material is not determined by the appearance, but by the physical properties.

Conclusion

Mass Loaded Vinyl can be an effective and affordable product for soundproofing when used correctly. Soundproofing with MLV blocks noise, keeping sounds from transferring from one space to the other. To be effective, 100% of the shared surface must be covered. See our Ultimate Guide to Mass Loaded Vinyl for detailed installation instructions.