

NAIMA
NORTH AMERICAN INSULATION
MANUFACTURERS ASSOCIATION

Noise Control

**Sound Advice
for Today's
Families**



Contemporary Living Is Noisy

Today's homes are filled with decibel-raising high-tech gadgetry including big screen TVs, computer games, CD players and stereo systems. Add to this the changing dimensions of today's homes – we now have home offices, media rooms, spacious kitchens with 'great rooms' attached – and the net result is a noise-laden environment that can adversely affect your family's sleep, stress levels, and quality of life.

Consequently, more and more homeowners are looking for ways to "soundproof" their homes to diminish unwanted noises from both inside and outside the home. One of the most economical ways to make a home quieter is to install fiber glass insulation. A good sound insulation package not only increases the comfort of your home but also adds to its value.

Sources of Noise in a Typical Home

Dishwashers, washers, dryers, garbage disposals, blenders, vacuum cleaners, radios, computers, CD players, stereos, TVs, lawnmowers and leaf blowers.



Noise Can Adversely Affect Quality of Life

Noise can affect sleep, blood pressure and digestion. In primitive times, loud noises were danger warnings. Though this is not true today, the body still reacts biologically as if they were.

What is Noise?

Noise is simply unwanted sound that is transmitted by vibration through air, walls, floors or ceilings. In a home, most people

consider noise to be just about any sound other than those made by what they are doing. For example, if a person is on the phone, they don't want to hear the television in the next room. Conversely, if a person is watching TV, they don't want to be able to hear the telephone conversation. Unfortunately, most walls and ceilings in today's homes are only marginally effective at blocking noise.

Noise Is Measured in Decibels (dB)

- Whispers – about 20 dB
- Normal conversations – about 60 dB
- City traffic – about 80 dB
- Lawn mowers/leaf blowers – around 103 dB

Repeated exposure to sounds over 85 decibels is considered dangerous to hearing, and the louder the noise, the less time it takes to damage hearing.



STCs, IICs and Sound Transmission

In the 1970's, HUD/FHA set minimum requirements for Sound Transmission Class (STC) ratings for airborne noise reduction through walls and partitions. An STC value is a single number rating used to characterize the sound insulating value of a partition (wall, floor, or ceiling). A partition prevents sound from being transmitted from one area to another. The higher the STC rating, the less sound will be transmitted through the wall, floor, or ceiling. Different STC ratings are recommended for different rooms within the home (see below).

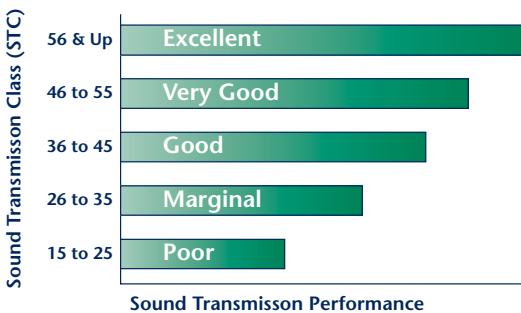
What Do STCs Measure?

STC ratings measure transmission of speech and other sounds in a way that agrees with how the human ear perceives it.

HUD/FHA also set minimum requirements for Impact Insulation Classes (IICs) for impact noise levels through floors. As with STCs, the higher the IIC value of a floor/ceiling, the better its ability to control impact sound transmission. An IIC rating of 50 or higher is considered acceptable.



Table 1 – Noise Control (STC) Ratings



Recommended STCs

For residential partition walls, recommended STCs depend on the particular type of room: for example, for bedrooms,

an STC of 45 to 55 is good, and above 55 is excellent. Living rooms should be a couple of points higher; bathrooms and kitchens up to 5 points higher.

Noise Control Strategies

Most conventionally built partition walls made of lumber and drywall have poor STC ratings ranging from a bare minimum of about 15 to 35. There are a number of measures that can be taken to raise the STC number, including:

Acoustic Insulation

By far the easiest and most economical method for controlling noise is to install insulation in the wall cavity. A 2x4 wood stud wall with 1/2 inch gypsum board and 3-1/2 inches of

acoustic fiber glass batt insulation absorbs and dampens sound waves and results in an STC of 38.

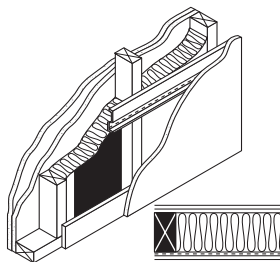
Fiber glass Insulation

Fiber glass acoustic batt insulation is economical, lightweight and easy to install. Acoustic batts are essentially the same as their corresponding thermal batts, except that they may differ slightly in size and density. A partition with either fiber glass acoustic or thermal batts having similar properties achieve the same STC rating.

Resilient Channels Plus Acoustic Insulation

An even more effective way to increase the STC rating is to use resilient channels between drywall and studs or joists. Properly installed resilient channels will break the vibration path which will help reduce sound transmission. Typically, the drywall is screwed to a flange on these channels, not to the studs.

Combining insulation, gypsum board mounted on resilient channel, and two layers of 1/2-inch gypsum on one side achieves a very good STC rating of 52.



Other Sound Control Strategies

Other sound control strategies include using heavier building materials (like adding one or two layers of gypsum to a wall construction) to block the path of the noise through walls, floors, or ceilings. While this creates thicker walls, they may not be structurally practical or cost effective.



▲ Guidelines For Installing Insulation in Interior Walls

The basic guideline for installing insulation into sidewalls is to fit the ends of batts snugly against top and bottom framing. (Check local building requirements for location of vapor retarder.)

Working from the top down, staple the pre-formed flanges about 8 inches apart until you reach the bottom. Continue this around the perimeter of the room.

▼ Guidelines For Installing Insulation in Exterior Walls

Exterior walls should be constructed with resilient channels and fiber glass insulation in the stud cavity. If a residence is impacted by overhead aircraft, then resilient channels should be used in roof/ceiling assemblies as well as using at least 9 inches of blown-in fiber glass insulation in the attic. The insulation should overlap the top of the joists by at least 1 inch. Make sure the vapor retarder is toward the heated side of the home. Humid climates may require the vapor retarder to be installed facing the exterior of the wall. (Check local building requirements for location of vapor retarder.)



Insulation Choices and STC Ratings

Fiber glass and cellulose are the two most commonly available insulation materials used for sound control. Cellulose manufacturers claim that their insulation, when used in a partition, gives higher STC values than fiber glass insulation. This, however, is not accurate.

The fact is there is no significant difference in STC ratings between using fiber glass or cellulose insulation. This has been scientifically proven by numerous sound transmission loss tests conducted at independent laboratories. Test results have shown STC ratings for walls using either cellulose or fiber glass insulation are within 1 or 2 points of each other.

Sound Control Practices

- Insulate heating and air conditioning ducts by using fiber glass flex ducts, fiber glass duct board or by wrapping or lining the ducts with fiber glass insulation.
- Install thick carpeting and padding throughout your home to help reduce impact sound.
- Caulk around windows and use weatherstripping at the bottoms of your exterior doors.
- Use solid wood or mineral core doors where privacy is demanded.
- Install acoustic ceiling panels.
- Double or triple pane glass and storm windows can all help reduce sound transmission through windows.
- Select quiet, high quality appliances.

- Install telephones, doorbells, intercom or audio built-ins on interior walls only, never on common walls or corridor walls.
- Caulk holes made by wiring which penetrates connecting structures with elastic non-hardening caulk or dry packing.
- Seal openings around ceiling fixtures so they are airtight.
- Make use of plants, draperies and wall hangings throughout your home. The more “soft” objects in a room, the more sound is absorbed.
- Minimize window sizes facing noisy areas.
- Ask your builder to make sure electrical boxes fit snugly in drywall. Gaps can be caulked to reduce sound leaks.
- Ask your builder to develop a well-planned layout to minimize the noise of flowing water. Insulate walls containing drain pipes.
- Ask your builder to seal under all bottom plates as the walls are being built.
- Ask your builder to avoid undercutting doors if possible. Frequently, doors must be undercut to get proper air circulation for the HVAC. A simpler solution to ensure proper ventilation is to keep doors open when rooms are not in use.



ABOUT NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

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