

Controlling Sound With Icynene®

Controlling sound in single and multi-unit dwellings is an important design consideration today. Selecting the right materials, including insulation, will determine how effective sound control measures will be. Icynene® is a spray in place two-component liquid material that expands into low-density foam. Icynene® provides excellent sound deadening properties in buildings.

Airborne Sound

Sound can travel through a variety of mediums, but the most common is through air. Loud stereos, highway and city noise, and human speech are common sources of airborne sound. Sounds propagate through the air at many different frequencies, but it is the mid-range frequency noises that are most noticeable. The most effective way to eliminate the transmission of these sounds is to effectively control air movement. Icynene® is an air barrier thus it effectively reduces these types of sounds.

Flanking sound

Often, reducing airborne sound by providing an air barrier material is not enough. Every possible pathway that sound can travel through the assembly to another room must be eliminated. This is flanking sound, and to have a reasonable chance of eliminating it, a site applied material that fills every gap and crevice must be used. It is a known fact that flanking sound can reduce STC (Sound Transmission Class) ratings by up to 5 or more. This is why STC requirements for sound barrier construction are high, because designers know these values will not be achieved in the field.

Icynene® fills every gap and crevice in the building cavity while adhering to all adjoining components for a tight seal. This greatly reduces flanking sound, and can produce STC ratings similar to theoretical design values in a smaller cavity, thus using less material and saving money.

Reducing plumbing noise

Running water can cause the piping behind walls and above ceilings to vibrate, and transfer that sound into the structure of the house. Once the vibrations get into the structure, the sound can be transmitted to other parts of the building. This is a big issue in apartment dwellings when everyone turns the shower on at 8 o'clock in the morning. Icynene® is a flexible, open cell material that can be applied around these pipes. The vibrations will then be greatly dampened, and structure borne noise reduced. Properly securing the piping inside the wall or ceiling and good design will minimize the vibration and water hammer sound even more.

Impact noises and structure borne vibrations

Icynene® is a great insulator to airborne sounds, and can also be combined with other materials to reduce impact and structure borne vibrations. Impact noise is not being transmitted through the air; rather it is causing vibrations within the building assembly itself. Adding insulation will not dampen those sounds effectively; the floor must be isolated from the rest of the structure.

Combined with drywall mounted on resilient channels, Icynene® provides a structural break between two parts of a structure, isolating the vibration or impact noise from the people on the other side. Insulating equipment rooms with Icynene® and mounting the equipment on isolating pads reduces both low frequency vibration sounds, and the airborne noise transmitted by such machinery.

STC and NRC ratings

ASTM testing (standard E-90) in a 2x4 wood frame assembly gives Icynene® an STC rating of 37. The NRC rating in the same test is 70. It is important to realize that these values, like similar values for all insulating

materials, are obtained in ideal laboratory conditions. It is commonly accepted practice to reduce these numbers by 5 or more to more accurately simulate field conditions. The quality of installation is the main determinant to producing an effective sound barrier.

Icynene® is a site applied material that adheres to most building substrates. In practice, Icynene® performs better than most pre-manufactured batt-type materials, since the material is custom installed for each project. By completely sealing every cavity in a wall or ceiling, Icynene's® STC and NRC ratings obtained in laboratory conditions are close to what is achieved in the field, since flanking paths are eliminated. Further reduction in sound transmission can be achieved by adding mass to the wall or ceiling. Every doubling of mass will reduce the STC by 6 dB. Since Icynene® is a low density, lightweight material, adding gypsum board or drywall to a sound barrier is an easy and effective way to significantly increase STC values.

Acoustics

Product: The Icynene Insulation System®

Sound Transmission Class (STC)

Testing Organization: Gold Bond Building Products
Research Center

Test Method: ASTM E90-83, E413

Standard test method for the laboratory measurement of airborne sound transmission loss of building partitions.

Date: May 1988

Result: STC-37

Wall assembly consisting of:
- 2x4 wood studs
- 3.5" Icynene®
- 1 layer of 5/8" gypsum wallboard on each side

Noise Reduction Co-efficient (NRC)

Testing Organization: Gold Bond Building Products
Research Center

Test Method: C423-84

Standard method for the measurement of sound absorption.

Date: May 1988

Result: NRC – 0.7

Comments: The Icynene Insulation System® has an added advantage over other similarly rated materials, in that it air seals the structure when it is applied. The above tests do not allow for loss of rating due to air leakage.