

STC- Sound Transmission Class, Coefficients and Noise Reduction for Handi-Foam

Sound Transmission Class

The term "STC" generally refers to the "Sound Transmission Class" of a particular building material, wall or partition. The standardized test methods most commonly used to classify the sound transmission properties of a barrier are ASTM E 90 and ASTM E 413. The higher the STC rating, the more effective the barrier is at reducing the transmission of most common sound frequencies. Handi-Foam Two-Component polyurethane froth foam has been independently tested according to these standards, and will achieve a STC of 18 at two inches thick, and 16 at 1 inch thickness. STC's for thinner thicknesses of foam can be reasonably extrapolated to an approximate value, i.e. ½" Handi-Foam has an STC of about 15.

STC ratings for wall components are not additive. The total STC rating of a wall consisting of, for example, insulation, drywall, wood studs, plywood or OSB, etc., will not necessarily be the sum of the various component STC ratings. Therefore, the entire wall assembly, as installed, should be tested in order to determine its true Sound Transmission Class. For example, a ½" monolithic coating of spray applied polyurethane foam, in addition to contributing the STC properties as described above, will also help to deaden sound caused by vibration by adhering to, and bonding together the sheathing and studs. Also, small cracks or gaps in the wall structure (known as "flanking paths") will allow sound to transmit more freely, and lead to a lower overall STC rating. For this reason it is critical that all potential flanking paths be eliminated or reduced, and Handi-Foam polyurethane foam is an excellent product for sealing these small cracks and gaps. The term "STC" is also sometimes used to describe the "sound transmission coefficient", which is a mathematical ratio dependent on the specific frequency of sound. It is used to determine the Transmission Loss, and ultimately, the Sound Transmission Class. The relationship between the sound transmission coefficient (t) and the Transmission Loss (TL) is; $TL = 10 \log (1/ t)$

Noise Reduction Coefficient

The "Noise Reduction Coefficient" (NRC) is a measure of how much sound is absorbed by a particular material, and is derived from the measured Sound Absorption Coefficients. The test methods most commonly used to determine sound absorption are ASTM C423 and ISO 354. Listed below are the Noise Reduction Coefficients for a typical 2 lb/ft³ polyurethane foam measured at different thicknesses;

Thickness measured	Noise Reduction Coefficient (NRC)
1/4"	.20
3/8"	.30
1/2"	.40

3/4"	.50
1"	.50

These NRC can be viewed as a percentage of the sound waves which come in contact with the foam that are not reflected back within the room (example: .50 = 50%).