



### Acoustical Testing

Laboratory tests are performed on various building materials to determine their effectiveness at abating and partition attenuating airborne sound.

ASTM C423 – 09a is a Standard Test Method for determining **Sound Absorption** and **Sound Absorption Coefficients** of material assemblies. Test results are provided listing the assembly’s **noise reduction coefficients (NRC)** and related **sound absorption averages (SAA)**, which is a rating of their efficiency.

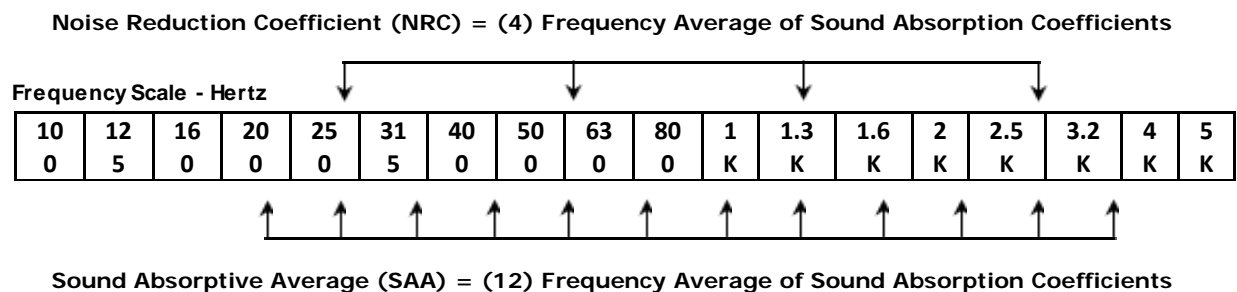
ASTM E90 - 09(2016) is a Standard Test Method used for measuring a building material’s ability to **partition sound** and prevent it from transmitting from one space to another. It measures the **airborne sound transmission loss** of building partitions such as walls of all kinds, floor-ceiling assemblies, doors, windows, and other space-dividing elements. Sound transmission loss ratings are provided listing the **Sound Transmission Class (STC)** of the materials tested.

### Noise Reduction Coefficient – NRC

Sound absorption tests measure the sound reduction capabilities of a material by how well it either absorbs or reflects sound energy. **Noise Reduction Coefficient (NRC)** are unit measures indicating a product’s sound absorption qualities. An NRC rating of 0.00 indicates zero sound absorption and 100% reflection; an NRC rating of 1.00 indicates 100% absorption with no reflection occurrence. Ergo, the higher the NRC measurement, the more absorptive the material is.

The NRC is calculated by averaging four mid-range sound absorption coefficients at frequencies: 250 Hz, 500 Hz, 1000 Hz and 2000 Hz, rounded to the nearest 0.05 increment. These frequencies represent the general hearing acuity of human speech and thus the NRC provides a simplistic number of how well a material will absorb the human voice.

Specifications for acoustical materials typically include an NRC, but its practical use may be limited when assessing its effectiveness at controlling problem noises. A broader frequency range is required for most other sound attenuation, e.g. music, school and work-place noise. Additionally, concentrated problem noises are produced by amplified music and mechanical equipment, e.g. pumps, transformers, and generators having substantial low-frequency energy below the NRC targeted frequencies.



### Sound Absorptive Average – SAA

A more useful single number rating obtained from ASTM C423 testing is the Sound Absorption Average (SAA). It is the average of the twelve sound absorption coefficients for the frequencies from 200 Hz to 2500 Hz, rounded to the nearest 0.01 increment. Superseding the NRC, the SAA provides a broader scope of a materials ability to absorb sound. As with the NRC value, the higher the SAA value, the better the material absorbs sound.


### Sound Transmission Class – STC

Sound partitioning tests determine how well a building product or assembly performs as a barrier to airborne sound passing through it. This airborne sound reduction efficiency is expressed as Sound Transmission Class (STC). The STC is a "one-number" average derived from sound attenuation values tested at sixteen standard frequencies from 125 Hz to 4000 Hz and indicate the product's sound barrier qualities.

Sound Transmission Class (STC) = (16) Frequency Average

Frequency Scale - Hertz

10	12	16	20	25	31	40	50	63	80	1	1.3	1.6	2	2.5	3.2	4	5
0	5	0	0	0	5	0	0	0	0	K	K	K	K	K	K	K	K



Utilizing dense, weighty, mass-laden materials are the most effective means to design and construct walls to prevent problem noise from transmitting from one space to another. Poured concrete and concrete block walls achieve significantly higher STC values than equally thick wood or metal framed walls.

Even though **SOUNDBLOX** ACMUs have slots in one face shell, they still have slightly better sound transmission loss than ordinary hollow CMUs of the same thickness and composition, because of the acoustical effects of the resonator mechanism and their heavier-than-normal, solid-top configuration. Although the primary function of **SOUNDBLOX** ACMUs is sound absorption, they can also be utilized as effective sound barrier.