MPS No. 1005

Subject: **Soundproofing**

Date: **January 2008 (Revised January 2019)**

Design of wall, floor, or roof elements may require special attention to the sound transmission performance. Sound Transmission is measured by ASTM E-90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions." The test measures the sound transmission loss for sound with frequencies from 125-4000 Hz. This range is the most important part of the hearing range. The results of the test are further classified into a Sound Transmission Class (STC) which is useful in comparing different building systems. The significance of STC ratings can be seen by a review of the following information on STC ratings.

STC rating

25 Normal speech can be understood quite clearly.

30 Loud speech can be understood fairly well.

35 Loud speech audible but not intelligible.

42 Loud speech audible as a murmur

45 Must strain to hear loud speech.

48 Some loud speech barely audible

50 Loud speech not audible

The design of systems which have high STC ratings relies on passive absorption, barriers, and proper construction details.

Passive Absorption

When sound passes through materials, the energy of the sound is reduced by absorption. Acoustically absorptive materials force sound to change directions many times and travel long distances before the sound passes through. Each time a sound wave changes direction, some energy of the sound wave is lost.

Barriers

Since sound is a form of energy, barriers can be used to reduce sound transmission. An effective barrier has a high mass (weight and density) and a low resonant frequency to stop (or reflect) this energy.

Construction Details

Building components designed to have a high STC rating rely on proper construction. It is critical that details must be followed to eliminate any cracks or air gaps. Sound will find its way through the smallest crack.

ThermaFoam R-Control insulation can be used in the design of walls having specific STC ratings when constructed with various components, such as gypsum board, sound channels, and sound insulation. The use of ThermaFoam R-Control insulation in sound walls should be verified by testing in accordance with ASTM E-90.

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