



Sound Attenuation Guide for XeteX Cabinet Panels

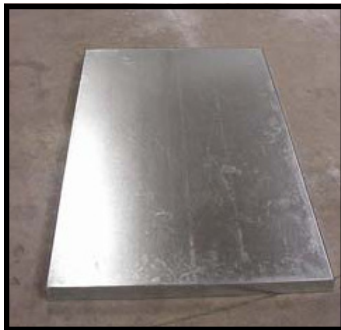
The acoustic properties of XeteX cabinet panels have been evaluated by an accredited independent laboratory. Results show they effectively isolate HVAC equipment noise.

Construction

Insulation has the greatest effect on cabinet acoustical properties. All XeteX panels come with sheet-metal-encased, 3# density, hardboard fiberglass insulation in thickness of 2 or 4 inches. Panels with both these thicknesses have been acoustically tested.

Summary Results

The results demonstrate that XeteX cabinets are effective at acoustically isolating the HVAC equipment they house. At common test frequencies, the two inch insulated wall reduces volume by a factor of almost 16, and the four inch wall by a factor of 32. At the lower frequencies more commonly emitted by HVAC equipment, the two inch wall reduces volume by a factor of almost 7 and the four inch wall by a factor of 8.



XeteX 2" Panel



XeteX 4" Panel

Acoustic Performance—TL

The most commonly tested measure of acoustic performance is Transmission Loss (TL). TL is the decibel reduction that sound experiences as it travels through an object. For example, if the sound emitted

on one side of a wall has a volume of 100 dB (at the wall's surface), and it is audible on the other side of that wall at 60 dB, the wall is said to have a TL of 40 for that sound. Since the decibel scale is logarithmic—adding 10 dB to any sound will double the perceived volume—a TL of 40 means that the noise is reduced by a factor of 16 (i.e., for a loss of 40 dB, the magnitude of noise reduction doubles four times: $2 \times 2 \times 2 \times 2 = 16$).

The amount by which a physical object attenuates sound always depends on the frequency of that sound. Low frequency sounds penetrate more easily through solid material than do high frequency ones. The TL of an object, therefore, will vary for sounds emitted at different frequencies. The relationship between frequency and TL also differs between materials, meaning that different materials are better at attenuating sound at different frequencies.

For the purpose of comparing different materials, a single-number acoustical rating system has been developed. The rating is determined by measuring an object's TL at 16 standard sound frequencies. The results are then graphed and compared with the plots of several reference curves. These reference curves each represent a class of sound insulation. The class with the reference curve that most closely estimates the actual measured TL is the Sound Transmission Class (STC) for that object.

The STC reference curves, however, are calibrated to reflect noises similar to human speech. They are less accurate as an estimate of how well an object will attenuate lower-frequency sounds like those emitted by HVAC equipment.

Acoustic Performance—OITC

Another rating system, the Outdoor-Indoor Transmission Class (OITC) was developed to evaluate lower frequency sound. It is far more accurate for evaluating the type of noise emitted by HVAC equipment.

The OITC is determined in the same way as is the STC. The TL of a wall is measured at sounds across a range of standard frequencies. The results are then graphed and compared to several reference curves, each representing a different OITC class. The OITC with the reference curve that most closely resembles the wall’s TL plot is the OITC for that wall.

Testing Procedures

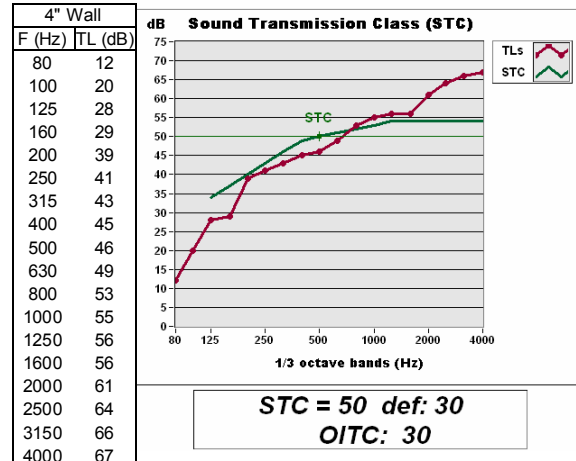
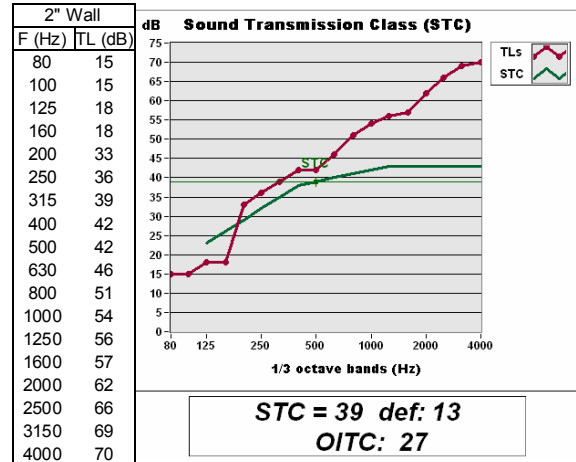
The acoustical performance of XeteX cabinet walls was measured by an independent laboratory accredited specifically to conduct these tests. Tests were done in compliance with the ASTM E90 standard. The lab measured the TL of standard XeteX two-inch thick (18 ga outer wall, 22 ga inner wall) and four-inch thick (16 ga outer wall, 22 ga inner wall) cabinet panels for sixteen standard frequencies. The STC was then determined for each wall as specified in ASTM E413.

The OITC was then determined for each XeteX panel by following the ASTM E1332 standard. Measured TL values were compared with the reference contours and the OITC was calculated according to the ASTM standard.

Results for XeteX Panels

The XeteX two inch panel has an STC of 39 and an OITC of 27. This means that, across the STC frequency noise range, the wall will attenuate sound by a factor of almost 16. Across the OITC frequency noise range, it will attenuate sound by a factor of almost 7.

Similarly, the XeteX four inch panel has an STC of 50, meaning that it attenuates sound by a factor of 32. Its OITC was found to be 30, meaning that it will attenuate sound in this frequency range by a factor of almost 8. The actual test results are shown below:



Mechanical Specification

The acoustical performance of cabinet panels shall be tested by an accredited independent laboratory under the ASTM E90 and E1332 standards and have a certified STC rating of [39 for 2” walls, 50 for 4” walls] and an OITC rating of [27 for 2” walls, 30 for 4” walls]. Sound absorption data is not an acceptable substitute for OITC rating data. Manufacturer shall provide a testing report from the accredited independent laboratory and Transmission Loss data upon request.