

## Effect of Blow-In-Blanket® System on Sound Transmission

### 1. Sound Transmission Loss Testing

Sound-isolating wall assemblies were tested in an NVLAP-accredited laboratory in order to determine the acoustical effectiveness of the Blow-In-Blanket System (BIBS®). An assembly was constructed with 2x4 wood studs on 16-inch centers, metal resilient channels mounted horizontally on 24-inch centers, and one layer of 1/2-inch gypsum wallboard on each side. The assembly was tested to measure transmission loss (TL) and sound transmission class (STC) with:

1. No insulation
2. BIBS insulation system

In addition, the assemblies were tested both with no penetrations, all joints taped and sealed and also with an obstruction and penetrations.

The obstruction and penetrations were the following.

1. Vertical 3-inch iron drain pipe
2. Single metal electrical box
3. Two metal electrical boxes, mounted back-to-back on opposite sides of the assembly.

Transmission Loss (TL) is a measure of the sound performance of a wall at a specific sound frequency. TL was measured at numerous frequencies, but the speech frequency range, which is between 500 and 2000 Hz, is of particular interest to homeowners. STC is a standard method for rating the wall, which incorporates the entire frequency range that people can hear. **The higher the TL or STC value, the better the wall is at blocking sound transmission.**

Insulation Package	STC wall without obstructions & penetrations	STC wall with obstructions & penetrations	TL value wall with no penetrations (500–2000 Hz)	Maximum TL reduction due to penetrations (500–2000 Hz)
No Insulation	35	37	48db	5db
BIBS	46	46	61db	3db

### From the tests results, several conclusions were drawn:

1. BIBS insulation significantly increased the TL values and STC rating of the wall.
2. Penetrations in a wall system did not reduce overall STC but did reduce sound control performance at speech frequencies.
3. BIBS reduced the TL penalty caused by penetrations.
4. Assemblies with BIBS were quieter at speech frequencies (2-3 decibels).

## II. Sound Intensity Contour Maps

In a related test, a smaller assembly was constructed with wood studs, resilient channels, and gypsum wallboard. Penetrations were made for single and back-to-back metal electrical boxes, as shown in the graphs to the right. The assembly was tested with:

1. No insulation
2. Fiber glass batt insulation
3. BIBS insulation system

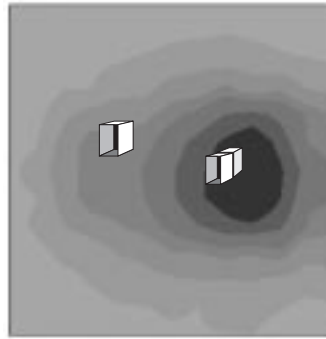
In order to simulate a field installation, instead of laboratory conditions, the R-11 kraft-faced insulation was cut with up to 1/8" gap around all three metal electrical boxes. No insulation was installed between the back-to-back electrical boxes.

High sound levels were generated on one side of the assembly, and sound energy was transmitted through the panel. On the quiet side of the assembly, a sound intensity probe was used to scan the surface, measuring regions of locally high and low sound intensity levels.

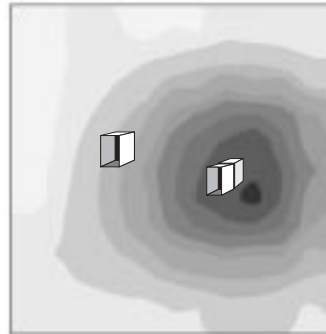
Sound intensity contour maps were generated from the experiment to graphically display the sound energy transmitted through the wall. The colors indicate local regions of low or high sound transmission.

The contour maps clearly show the leakage through the back-to-back electrical box penetrations, and slight leakage from the single metal electrical box penetration.

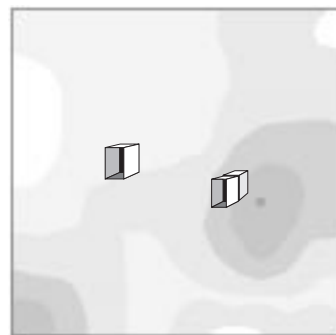
The three tested assemblies show great contrast in their overall levels, and demonstrate the importance of quality installation in sound-rated insulated assemblies. The small gaps in the R-11 batt insulated assembly can clearly reduce the overall effectiveness of the sound control of the wall in the 500 to 2000 Hz frequency range. With the Blow-In-Blanket System and professionally-trained BIBS installers, the gaps are virtually eliminated and superior sound control is achieved.



Wall with penetrations and no insulation



Wall with penetrations and batt insulation



Wall with penetrations and BIBS

Sound intensity is illustrated in the above drawings by shaded areas. The darker grays show more sound leakage than the lighter grays. As you can see, the wall assembly's electric box is indicated on the left; the double electrical boxes are indicated on the right.



### Blow-In Blanket Contractors Association

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