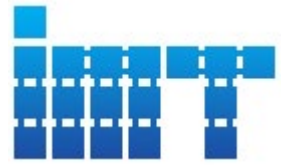


# Interesting Facts: Sound Transmission



Region of Niagara

The ability of a wall, floor, or ceiling to resist the transmission of airborne sound is expressed by its Sound Transmission Class (STC) rating. For example if the sound on one side of a wall is measured at 100 decibels and drops to 60 decibels on the other side, the wall blocks 40 decibels of sound and earns an STC rating of 40. STC ratings are given to a variety of wall assemblies based on acoustical testing.

Ref: <http://bct.eco.umass.edu/publications/by-title/creating-a-soundproof-office/>

The STC rating is a lab test that does not take into consideration weak points, penetrations, or flanking paths.

NRC and STC are exclusive of one another. A material with high NRC will help to absorb sound, yet the same material may have a low STC and allow a large amount of sound to pass through into an adjacent room.

How to improve the STC of a wall structure....

## Adding Mass

The weight or thickness of a partition is the major factor in its ability to block sound. For example, a thick concrete wall will block more sound than a thin gypsum/2x4 wall. Mass is commonly added to existing walls by adding additional layers of gypsum. When the mass of a barrier is doubled, the isolation quality (or STC rating) increases by approximately 5 dB, which is clearly noticeable.

**NOTE: IMT uses 2 layers of 5/8" MDF which has lower sound transfer characteristics than gypsum**

## Increasing or Adding Air Space

An air space within a partition can also help to increase sound isolation. This, in effect creates two independent walls. However, the STC will be much less than the sum of the STC for the individual walls. The airspace can be increased or added to an existing partition. A common way to add an airspace is with resilient channels and a layer of gypsum. An airspace of 1 1/2" will improve the STC by approximately 3 dB. An air space of 3" will improve the STC by approximately 6 dB. An airspace of 6" will improve the STC by approximately 8 dB.

**Note: IMT has an air space of 2.75" making it one of the larger air spaces in the modular wall market**

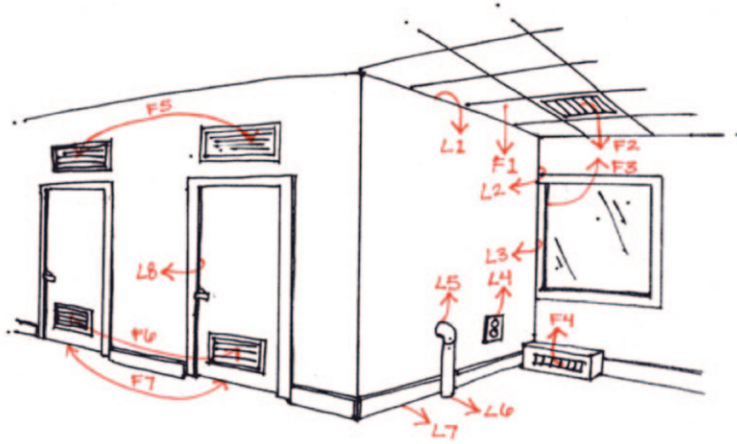
## Adding Absorptive Material in the Partition

Sound absorptive material can be installed inside of a partition's air space to further increase its STC rating. Installing insulation within a wall or floor/ceiling cavity will improve the STC rating by about 4-6 dB, which is clearly noticeable. It is important to note that often times, specialty insulations do not perform any better than standard batt insulation.

**Note: IMT incorporate a 1" batt in all solid wall cavities**

Even with a high STC rating, any penetration, air-gap, or "flanking" path can seriously degrade the isolation quality of a wall. **Flanking paths** are the means for sound to transfer from one space to another other than through the wall. Sound can flank over, under, or around a wall. **Sound can also travel through common ductwork, plumbing or corridors.** Noise will travel between spaces at the weakest points. There is no reason to spend money or effort to improve the walls until all the weak points are controlled.





### Flanking Paths

- F1: Open plenums – over walls and through suspended ceilings
- F2: Common Duct work
- F3: Adjacent Exterior Windows
- F4: Common Floor heaters
- F5: Open Vents
- F6: Louvered Vents
- F7: Under doors

### Leaks

- L1: Poor seal at wall and ceiling connection
- L2: Poor seal at wall to wall connection.
- L3: Poor seal at wall to mullion connection
- L4: Poor seal around outlet penetration...avoid back to back outlets
- L5: Poor seal at wall penetration
- L6: Poor seal at floor penetration
- L7: Poor seal at wall and floor connection
- L8: Poor seal around door

## RULES OF THUMB

General rules of thumb for controlling noise between spaces:

- A wall must extend to the structural deck in order to achieve optimal isolation. Walls extending only to a dropped ceiling will result in inadequate isolation.
- Sound will travel through the weakest structural elements, which, many times, are doors, windows or electrical outlets.
- When the mass of a barrier is doubled, the isolation quality (or STC rating) increases by approximately 5 dB, which is clearly noticeable.
- Installing insulation within a wall or floor/ceiling cavity will improve the STC rating by about 4-6 dB, which is clearly noticeable.
- Often times, specialty insulations do not perform any better than standard batt insulation.
- Metal studs perform better than wood studs. Staggering the studs or using dual studs can provide a substantial increase in isolation.
- Increasing air space in a wall or window assembly will improve isolation

Changes in STC Rating	Changes in Apparent Loudness
+/- 1	Imperceptible
+/- 3	Just perceptible
+/- 5	Clearly noticeable
+/- 10	Twice (or half) as loud

Ref: <http://www.stcratings.com>

