

SOUND RATED DRYWALL PARTITIONS

Sound Transmission Class, abbreviated as STC, is simply a numerical index evolved from a complex mathematical model which indicates how well a wall or floor-ceiling member functions in preventing the transmission of airborne noise from one space to another.

An STC of 50 or better is considered excellent, keeping out virtually all airborne sounds. (This does not take into account impact noises which are created by pounding on a wall and which are measured and reported in a different manner.)

An STC of 45 to 50 is very good, with loud singing, brass instruments or radio at full volume heard only faintly.

An STC of 40 to 45 is good - loud speech can be heard only faintly.

An STC of 35 to 40 is only fair - loud speech can be heard and is barely intelligible.

An STC of 35 or less is poor - loud speech can be understood fairly well.

Below 30 STC - normal speech can be understood easily and distinctly through the wall.

A partition assembly comprising 3-5/8" metal studs to which two layers of 5/8" gypsum wallboard panels are screw attached to each side with the joints taped and the perimeter completely caulked and taped will provide an STC of 50 when tested under laboratory conditions (as specified in ASTM E90-66T.)

Careless workmanship or inattention to detailing can render this high performance partition virtually worthless as a sound barrier. For example, if the partition is installed without tape at the joints or perimeter, and if caulking is not used, the STC may be as low as 28, at which level ordinary speech can be easily heard through the wall.

By merely taping the joints, the vertical angles and the ceiling angle, and abutting the carpet to the wall at the floor angle, the STC will be raised to 45. This same approximate rating can be achieved without taping if the vertical angles and the ceiling angle are filled with acoustical sealant. By caulking the floor angles as well, where tape is normally not installed, the job-measured rating can be increased to 48 STC which is very close to the laboratory rating of 50 - determined under ideal conditions.

In practice, it is very important to caulk the entire perimeter as well as taping and finishing all angles and joints. The reason caulking is important in maintaining a high STC is that building movement may cause cracking of the tape at the perimeter ultimately causing some airborne sound leakage.

The installation of a through electrical box in a 50 STC partition can lower the rating as much as 9 STC points if not properly detailed and created. It is preferable to stagger electrical outlets on opposite sides of a partition. However, where conditions dictate

back-to-back outlet positioning, there are means of treating the outlet to maintain the sound isolating performance of the wall:

Where a through electrical box is used, divide and seal off the opening by caulking in a steel plate. Also caulk the perimeters of the box at the entry - through both sides of the partition. This is essential in any installation of electrical boxes and in all cases as follows:

Back-to-back boxes, connected by conduit, can be treated simply by plugging the conduit with caulking, after wiring is completed.

Back-to-back boxes can be treated by sealing any air leaks in the box with caulking and by caulking the box perimeter.

Probably the most difficult situation to treat properly achieving maximum sound isolation in a partition is where there is a connecting door from space to space. A hollow core door installed without seals can drop the rating of a 50 STC wall as much as 26 points. Consequently, when a high performance wall is used, never specify a hollow core door since the money will be wasted insofar as noise isolation is concerned.

Good acoustics are usually achieved by eliminating faults rather than by the existence of a detail. Thus money should be spent for a high performance wall where it is needed. But, at the same time, there must be enough detail and workmanship employed to assure the full capability of the wall. Conversely, money can and should be saved on walls where it may be impractical (and sometimes not necessary) to have a high degree of noise isolation.

By following the basic steps of caulking, gasketing, and installing solid core doors, considerable sound isolation can be achieved at very little extra expense.

It must be remembered that an STC rating is obtained from carefully controlled test conditions, whereas buildings are a collection of systems and elements assembled in the field, often under adverse conditions.

The location of a structure is significant, because of variations in the level of masking background sound. Acoustical isolation of occupancies is more difficult in quiet, isolated locations than in busy metropolitan locations.