

# SOUND SOLUTIONS

No. 1

## ACOUSTICAL DOOR SEALS

One of the most common problems associated with inter-office acoustical privacy is sound leakage through doors. It is well known that door seals can provide a significant reduction in sound transfer through doorways, but the specific techniques of obtaining a good seal in practice is not. Door seals have been available for quite some time, but they have gained a less than favorable reputation in many projects because of poor installation, improper adjustment, or poor design of the seals themselves.

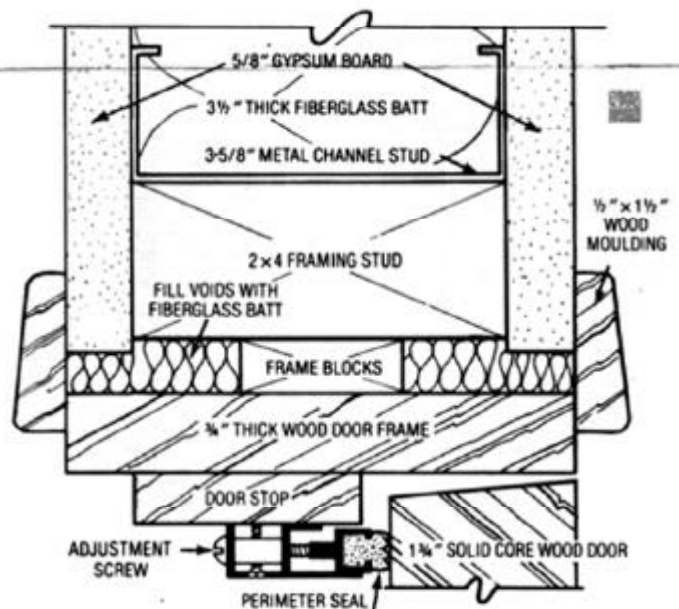
An unsealed solid core (1 1/4" thick) wood door will usually provide an equivalent STC rating between 15 and 20 with the standard 5/8" gap at the floor. If the same door is properly sealed, the equivalent STC rating jumps to between 25 and 30, or an additional 10 dB of noise reduction if there are no other sound paths involved. Subjectively, this can reduce the loudness of the intruding noise by as much as 50% which is substantial by any standards.

A solid core wood door is properly sealed by installing an automatic door bottom in the bottom of the door and perimeter seals on the head and jamb of the door frame as shown in the accompanying details. The following guidelines highlight many common problems:

1. Order the perimeter seals slightly longer than the finish dimensions of the door frame to allow sufficient length to miter the two head joints. Fill joints with putty.
2. Use adjustable perimeter seals as shown in the drawing. This will allow the seals to be readjusted at a later date when the door warps or comes out of alignment. The sealing element should be soft neoprene, not open cell foams or felt. Adjust the seals to be snug but not so tight that door closure becomes difficult. A business card should be able to slip between the neoprene element and the door and remain there without falling when it is properly adjusted.
3. Order the door hardware with a minimum 3 1/4" backset unless handle is the lever style. A standard 2 1/4" backset will result in less than adequate clearance between the knob and the seals and may cause minor knuckle injuries.
4. Size the door to obtain a 1/2" clearance at the floor if possible. Automatic door bottoms are supposed to provide closure for as much as a 3/4" gap at the floor, but it is best to have the clearance less if possible. Provide a level threshold. If the floor is carpeted, be sure the subfloor is level. Provide additional carpet-pad spacers under the carpet if necessary to obtain a level surface. Adjust door bottom to seal out light when the door is closed. The neoprene seal should retract when the door is opened.
5. Pack the cavity between the door frame and the partition with fiberglass batt as shown in the drawing. If it is too difficult to insert the fiberglass batt because there is insufficient clearance, place a bead of clear silicone

caulking under each side of the moulding to form an airtight seal between the partition and the door frame.

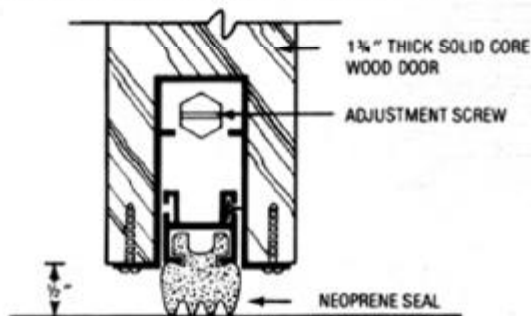
6. Remember that a properly sealed door must be air-tight. If the air circulation system in the room requires return or make-up air to enter the room via the gap under the door, the acoustical door seals will prevent this from occurring. The solution to this problem is to provide an auxiliary air transfer path which has sound isolation properties which will not compromise the overall acoustical integrity of the wall / door system.



HEAD AND JAMB SECTIONS

In addition to knowing how to properly seal a door, it is equally important to know when this solution is viable. As a general rule, the STC rating of the partition can be 10 to 15 points higher than the STC rating of the door. As a result, a sealed, solid core wood door should only be used in partitions with STC ratings from 35 to 45. The partition should extend full height to the structure above unless sound transmission via the ceiling plenum path has been controlled by other means. If doors are required in partitions with higher STC ratings, special acoustical doors should be used. There are several manufacturers which build acoustical doors with STC ratings up to 51 for these applications. These doors are very heavy, require special hardware and installation precautions, and are very expensive. Considerations for these types of doors are the topic of another SOUND SOLUTION.

A properly sealed solid core wood door will greatly improve the acoustical privacy between adjacent spaces if the guidelines presented here are carefully observed. The reader should be cautioned, however, that acoustical privacy is a complex subject which is dependent upon several factors including partition/ceiling construction, room characteristics, noise source characteristics and background noise spectrum and level. Design decisions involving a large number of rooms or extremely sensitive areas should be referred to a qualified acoustical consultant if optimum results are to be obtained at minimum cost to the owner.



SECTION AT FLOOR

The above information has been reviewed and is believed to be accurate, however we assume no responsibility for errors or omissions.