Specifying Acoustic Doors

Acoustical Door Assemblies

Acoustically door assemblies (ie. frame, hardware, and seals) are engineered to prevent a specific amount of airborne sound from passing through the door opening.

These assemblies are commonly used in schools, offices, hotels, and concert halls and more.

Acoustically rated door systems are growing increasingly popular in office buildings too. A few benefits of a quieter workplace include higher productivity, less sick time, and higher employee retention.

Acoustical Door Assemblies

- Assemblies are assigned **Sound Transmission Class** (STC) values
- The STC scale is a logarithmic progression: an increase of 3 points doubles the sound transmission reduction
- Steel is the optimum acoustic door material

STC 50 – 54	Very loud sounds are faintly heard
STC 40 – 49	Loud speech is barely audible
STC 35 – 39	Loud speech is audible but words hard to distinguish
STC 30 – 34	Loud speech can be distinguished but normal speech is barely heard or inaudible

Acoustical Door Assemblies

- Single door openings are readily available in a range of STC 32 – 54
- Pairs of doors are generally available up to STC 40 – 48
- Vision lights and embossments available

Acoustical Door Assemblies

- For doors with glass kits, the STC rating decreases as the glass kit size increases
  - Use of laminated glass with an air pocket is recommended to help reduce the transmission of sound waves

- Door openings rated up to STC 54 generally can be a standard 1¾” thick.

- Door openings rated STC 55+ can only be achieved with doors that are 2 ¼” or thicker. This increases the cost of the doors.

Acoustical Door Assemblies

Outdoor-Indoor Transmission Class (OITC)

- The measurement of sound transmission from the external environment into the building envelope

- Testing uses ASTM E1332 Standard Classification for the Determination of Outdoor-Indoor Transmission Class

- OITC includes a range of frequencies lower than the STC testing to more closely replicate the sounds of rail and vehicular traffic

Acoustical Door Assemblies

Test Methods

Door assemblies are tested in accordance with ASTM E90 acoustical ratings.

- A door is installed into a test wall with a high STC rating (greater than 60) between two rooms. One room is the source of the sound, while the other is the receiving room where measurement will take place.

- Different sound frequencies are generated and a sound attenuation value is determined at each frequency.

Acoustical Door Assemblies

Inoperable Test vs. Operable Test

- Perimeter of the door opening is sealed with putty and tape for the **inoperable test**

- The resulting acoustical value is solely for the door and frame assembly

- While this is a valid test condition, it is not indicative of the STC performance of an operable door

Acoustic Doors

Inoperable Test vs. Operable Test (con't)

- In the **operable test**, the door is in working condition and must open and close

- The resulting acoustic rating also highlights the loss of STC between the two tests. This is typically 1 to 5 STC points depending on the quality of the seal and threshold assembly.

- The STC rating from the **operable test** is what manufacturers publish

What STC Rating Do You Need?

- The STC rating of commercial steel doors are often in the 25-35 range.
- For situations where sound control is critical, such as in an office where confidential meetings are held, doors above STC 40, 45 or even higher may be needed.
- For these, some design professionals may choose to work with an acoustic consultant.

Specifying Acoustic Assemblies

- There's no need to overspecify acoustic doors. Often the intent is simply to suppress the sounds of people or equipment from room to room.

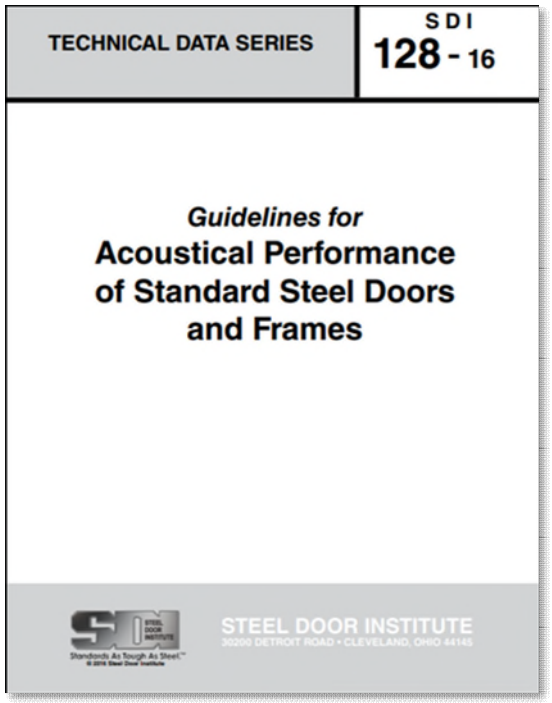
- Specifying a door with an STC rating in the 40s is adequate in most situations.

Specifying Acoustic Assemblies

- SDI does not recommend a specific core be specified for STC doors. The selection should be on the basis of the desired STC value rather than the core material.

- Make sure the required STC and OITC values are included in specifications.

Specifying Acoustic Assemblies



- Doors with STC above 35 **should not** be included in Spec Sections for standard or custom doors and frames.
- They should be specified as special assemblies warranting closer attention to details such as hardware, seals and installation.
- More information is available in **SDI 128** or by consulting a manufacturer.

Specifying Acoustic Doors

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