

ACOUSTICAL DOOR STC 40 AND STC 50

OVERVIEW

Acoustically rated, sound-retardant doors are used extensively in performing arts centers, concert halls, movie theaters, broadcast and recording studios, offices, health and medical centers. They are also critical to aerospace and defense installations as well as other industrial locations where noise control and/or privacy is required.

Current testing is being performed under ASTM E90-87 and ASTM E413-73 (reapproved 1980), which defines performance characteristics more precisely than older previous standards because of technological advances. In practically all cases involving tests made prior to 1983, acousticians regard these test results as obsolete and recommend the rejection of doors tested prior to 1983.

The obsolescence and lack of validity is due to the introduction within the past few years of changes to testing standards and of technological improvement to sound transmission and reception equipment. All Haley sound-retardant products are certified to the latest E90-87 test standard.

Specification writers and architects should be aware that acoustical testing is done under ideal conditions and to be assured of achieving similar results in the field will require close supervision of the design, construction and installation of all components involved. The walls, ceilings, ventilation systems, door frames, doors and gasketing must be installed properly to maintain the acoustical integrity of the sound controlled area.

SOUND TRANSMISSION TESTING

The test conducted to determine the acoustical rating of doors is done according to ASTM E90 which outlines the procedure for measuring sound transmission loss.

The Sound Transmission Loss (STL) is measured at 1/3 octave test frequencies — 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000 Hz (Hertz or cycles per second).

The Sound Transmission Class (STC) rating is derived by plotting the transmission loss curve for a particular type of door construction, at each of the 16 frequencies. The STL curve is then compared to a standard curve, established by ASTM E413-75, and the rating is determined when the test curve falls within the allowable parameters of the applicable standard curve.

There are two primary requirements which must be met for each STC classification. When the STL test curve is compared to the standard curve, there can be no STL, at any given frequency, which falls below the standard transmission loss measurement by more than +8dB (decibels). In addition, the summation of all STL measurements which fall below the standard curve cannot exceed +32dB.

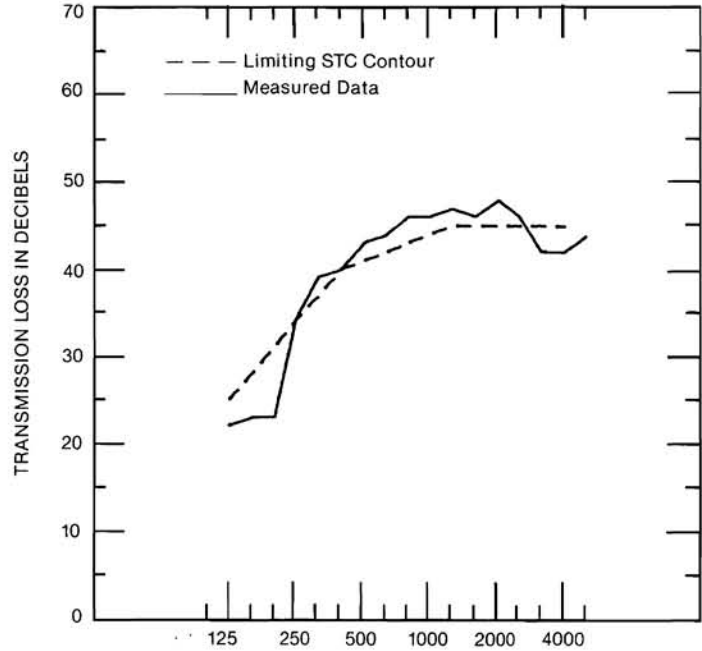
SINGLE NUMBER RATING SYSTEM

It would be impractical to try and compare a given product's performance at each frequency tested because of the difficulty in identifying the frequency of each noise source. For convenience in selection and comparing performance of similar products, a single number rating system has been developed: Sound Transmission Class (STC). This rating system can be used to determine if a wall, ceiling or door will offer sufficient resistance to sound transmission, so the transmitted sound level will fall below the desired level. Actually, it is seldom necessary or economically feasible to specify a door capable of preventing all sound transmissions. Due to the "masking" effect of normal background noise, sound transmitted through a wall or door assembly will be inaudible or "masked" if its intensity level is below the level of the receiving room.

The following table provides an indication of the effectiveness of various STC ratings in reducing the transmission of speech from room to room.

STC	Speech Heard Through Wall or Floor
30	Loud speech can be understood fairly well
35	Loud speech audible but not intelligible
42	Loud speech audible as a murmur
45	Some loud speech barely audible
48	Hearing strained to note loud speech
50	Loud speech not audible

TRANSMISSION LOSS REPORT



FREQUENCY IN HERTZ

1/3 OCT BND CNTR FREQ	125	160	200	250	315	400	500	630	800
TL in dB	22	23	23	34	39	40	43	44	46
95% Confidence in dB	2.48	1.38	1.29	1.15	0.90	0.97	0.49	0.60	0.69

1/3 OCT BND CNTR FREQ	1000	1250	1600	2000	2500	3150	4000	5000	STC
TL in dB	46	47	46	48	46	42	42	44	41
95% Confidence in dB	0.58	0.40	0.49	0.37	0.50	0.41	0.48	0.58	

ABBREVIATION INDEX

- FREQ. = FREQUENCY, HERTZ. (cps)
- T.L. = TRANSMISSION LOSS, dB
- C.L. = UNCERTAINTY IN dB. FOR A 95% CONFIDENCE LIMIT
- DEF. = DEFICIENCIES, dB < STC CONTOUR
- STC = SOUND TRANSMISSION CLASS

TEST SPECIMEN

The door achieving the STC-41 rating was a 3'-0" x 7'-0" x 1 1/4" flush door with wood veneer doorskins and a special sound deadening core. The perimeter of the door was equipped with sealing devices as described in this brochure. Standard hardware was used, consisting of a cylindrical lock and heavy duty full mortised hinges.

Any other construction, hardware configuration, or deviation from the test specimen could produce a different rating.



ACOUSTICAL DOOR

STC-40 SINGLE DOOR

STC-50 COMMUNICATING PAIR

TESTED & CERTIFIED UNDER ASTM E90-87



BUENA PARK, CA

ACOUSTICAL DOOR STC 40 AND STC 50

INSTALLATION INSTRUCTIONS

The performance of an acoustical door depends on the compatibility and quality of the installation of all the components including the wall, door frame, gasketing, hardware and door.

The installer must first note the perimeter clearances, positioning of the gasketing and adjustment of the bottom door seal

Haley's acoustical doors require a $\frac{3}{32}$ " clearance between the jamb of the frame and the hinge edge of the door, with a $\frac{1}{8}$ " clearance at the top of the door and the lock edge. The clearance at the bottom of the door should be $\frac{3}{8}$ " - $\frac{7}{16}$ " from the finish floor or $\frac{1}{8}$ " - $\frac{3}{16}$ " from the top of the threshold to the bottom of the door.

The lock edge should have a (3°) or $\frac{1}{8}$ " in 2" bevel. The hinge edge, top of door and door bottom should be square.

The frame must be plumb and square. The wall construction, door frame and installation of the frame should be accomplished in a manner to provide an assembly of a Sound Transmission Class (STC) rating equal to or greater than the specified classification of the door.

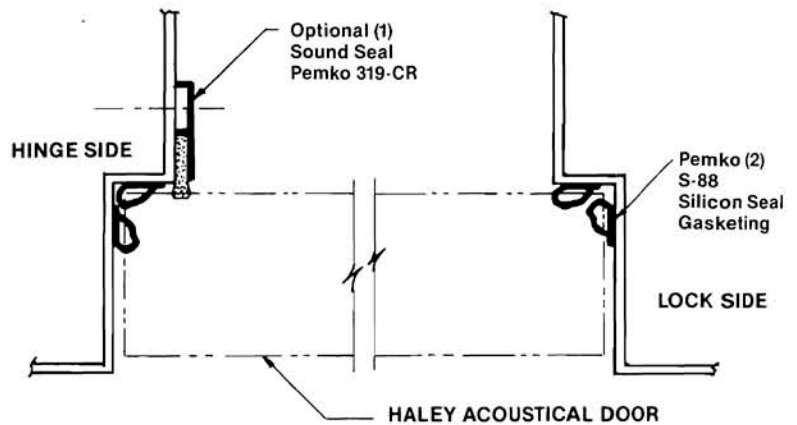
The gasketing positioned as shown in the details and hand trimmed to provide a tight, leak-proof seal in the frame rabbet or silicon caulking to the underside of the threshold and the joint where the threshold butts against the door jamb.

Hardware notes: The weight of Haley's STC door is approximately 9 lbs. per square foot. A 3070 door will weigh about 200 lbs. Therefore, heavyweight ball bearing hinges or Roton's 780-224 HD continuous hinges are required to properly support and swing the door.

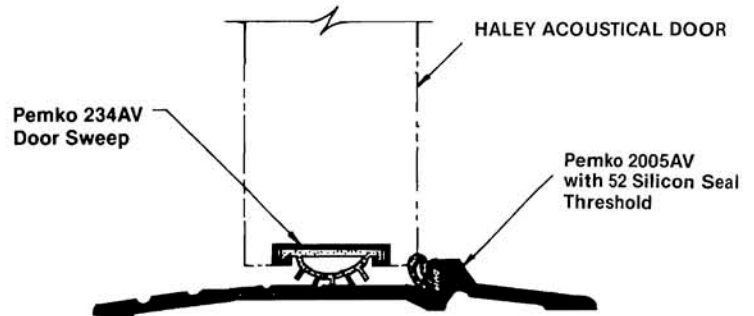
Lights (glazing) are not recommended. STC ratings shown are based on doors without cutouts. Any glass light (using acoustical rated glass) will somewhat reduce overall performance. Louvers are not permitted.

Acoustical doors in pairs must have solid mullion fully grouted with gasketing identical to single doors.

ACOUSTICAL DOOR GASKETING (Supplied with Door)



PERIMETER SOUND SEAL GASKETING



DOOR BOTTOM/THRESHOLD SEAL

PERIMETER SEAL NOTES

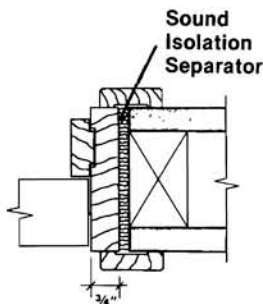
1. Haley's standard gasketing package includes a Pemko 2005 threshold, a 234AV door sweep/door bottom, and S-88 Silicon Seal gasketing. Doors tested with this package achieved a rating of STC-40.

With the addition of surface applied door seal, Pemko 319-CR, the same acoustical door achieved an STC-41 rating. The 319-CR seals can be supplied if an STC-41 rating is required.

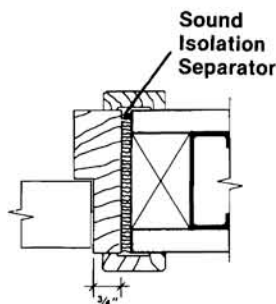
2. Position the S-88 Silicon Seal gasketing as shown. Note the difference between the gasketing placement on the hinge side and the lock side.

The door bottom-to-threshold seal is very important. The installer should check the flatness and level of the finish floor. Any unevenness may require an adjustment to the undercut of the door.

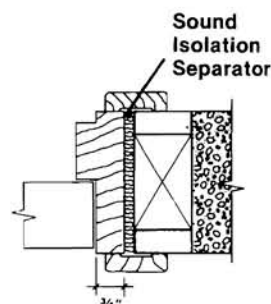
TYPICAL WOOD & HOLLOW METAL FRAMES



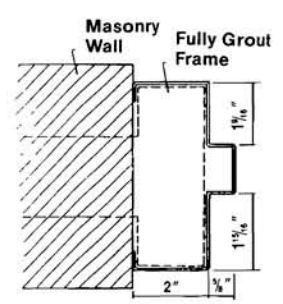
Applied Tee Stop Profile
Shown in Sound Rated Wood Stud Wall



Double Rabbet Profile
Shown in Sound Rated Masonry Wall



Single Rabbet Profile
Shown in Sound Rated Steel Stud Wall



Masonry Construction
with Butted Frame Detail

The sound rating of the wall and door frame installation must equal or exceed the expected STC rating of the door and gasketing.