

ETS-LINDGREN
ACOUSTIC RESEARCH LABORATORY
OFFICIAL LABORATORY REPORT
AS-TL3555

Subject: Sound Transmission Loss Test

Date: 24 March 2009

Contents: Transmission Loss Data, One-third Octave Bands
Transmission Loss Data, Octave Bands
Sound Transmission Class Rating
Outdoor / Indoor Transmission Class Rating
Airborne Sound Reduction Index

on

Richlite[®] r50 Composite Panel - 1/2" Thickness

for

Richlite USA

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INTRODUCTION

Sound Transmission Loss of a partition in a specified frequency band is defined as ten times the common logarithm of the airborne sound power incident on the partition to the sound power transmitted by the partition and radiated on the other side. The quantity so obtained is expressed in decibels.

APPLICABLE STANDARDS

ASTM E 90-04	"Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"
ASTM E 413-04	"Standard Classification for Rating Sound Insulation"
ASTM E 1332-90 (2003)	"Classification for Determination of Outdoor-Indoor Transmission Class"
ASTM E 2235-04e1	"Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods"
ISO 717-1:1996	"Acoustics -- Rating of sound insulation in buildings and of building elements Part 1: Airborne sound insulation"

SPECIMEN DESCRIPTION

The test specimen was comprised of one (1) composite panel of the nominal inside dimensions 1219 mm in width by 2438 mm in height by 13 mm in thickness [48 by 96 by 1/2 inches]. The test specimen was manufactured, submitted for test, and designated "**Richlite® r50 Composite Panel - 1/2" Thickness**" by Richlite USA of Tacoma, Washington. The product is described by the client as a composite paper product consisting of cellulose fiber and phenolic resin. Nominally 50% of the cellulose within this product is recycled cardboard. The specimen was fully cured at the time of test.

The surface area of the specimen was 3.0 square meters [32.0 square feet]. The weight of the test specimen was measured as 47.4 kg [104.5 pounds], giving a weight per unit area of 15.9 kg/m² [3.3 pounds/ft²].

TEST SPECIMEN MOUNTING

The specimen was mounted in a filler wall in the 2440 mm by 2440 mm transmission loss test opening. The face of the specimen was sealed to the edge of the test aperture with dense mastic putty. The calculated transmission loss of the test specimen was adjusted as necessary to account for sound power transmitted through the filler wall.

DESCRIPTION OF TEST

Three (3) loudspeakers in a 208 cubic meter reverberation chamber, designated as the "Source Room", produced broadband pink noise. A 408 cubic meter reverberation chamber, designated as the "Receive Room", is coupled to the Source Room through the transmission loss opening. The steady-state space-time average sound pressure levels in the Source and Receive Room were determined using rotating microphone booms and a Norsonics Dual-Channel Real-Time Analyzer Nor-840. Sound absorption in the Receive Room was determined by performing decay rate measurements. Measurements are made in the ISO-preferred one-third octave bands from 50 Hz to 10000 Hz. Sound Transmission Class (STC) is the single number rating that is calculated from Sound Transmission Loss values to provide a performance estimate of a partition in certain interior sound insulation situations. Airborne Sound Reduction Index (R_w), defined in ISO 717-1, is used internationally and is a similar rating to Sound Transmission Class (STC). Outdoor-Indoor Transmission Class (OITC) is the single number rating that is intended to rate effectiveness of building façade elements at reducing transportation noise intrusion.

Precision of calculated Sound Transmission Loss values varies with frequency band and is included in the table within this document. The test was performed in strict accordance with ASTM E90-04. Data for laboratory flanking limit and reference specimen tests are available on request.

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This test took place at **ETS-LINDGREN ACOUSTIC RESEARCH LABORATORY**, in Cedar Park, Texas, on March 9, 2009.

ENVIRONMENTAL CONDITIONS

During the test, environmental conditions in the Receive Room were 22.0C with 63.4% relative humidity. Conditions in the Source Room were 22.1C with 67.4% relative humidity. Environmental conditions remained within strict limits imposed by the laboratory.

Respectfully Submitted,



Michael C. Black
Laboratory Technical Director



TRANSMISSION LOSS DATA

Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and then presented graphically. Octave-band Transmission Loss values are calculated as described in Section 12.3 of ASTM E90.

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1/3 Octave Band Center Freq (Hz)	Transmission Loss (dB)	Uncertainty (+/- dB)	Notes	Octave Band TL (dB)	STC Deficiencies	R _w Deviations >8dB
50	13		[b][c][f]			
63	22		[b][d][f]	17		
80	22	4.6	[c]			
100	20	2.1				
125	24	1.9		23		
160	26	2.0				
200	25	0.8				
250	26	0.4		26		
315	28	0.5				
400	29	0.3			2	
500	31	0.4		30	1	
630	32	0.3			1	
800	33	0.3			1	
1000	34	0.2		33	1	
1250	33	0.1			3	
1600	28	0.2			8	
2000	28	0.2		29	8	8.2
2500	32	0.2			4	
3150	36	0.2				
4000	39	0.2		38		
5000	42	0.2				
6300	45	0.3				
8000	47	0.3		47		
10000	50	0.5	[c]			
STC	32	R _w	32			
OITC	29					

Note: [a]: Sound Pressure Level in Receive Room less than 5 dB above ambient. Correction of 2 dB applied. Value represents lower bound for specimen TL in this band; [b]: Specimen TL within 10 dB of facility flanking limits. No correction applied. Value represents lower bound for specimen TL in this band; [c]: Specimen TL corrected for sound transmission through laboratory filler wall per ASTM E90-04 Section 7.3.1.6; [d]: Specimen TL too close to laboratory filler wall. Values represents lower bound for specimen TL in this band; [e]: Uncertainty in this band exceeds limits of ASTM E90-04 Section A2.2.; [f] Insufficient number of independent microphone samples to determine test uncertainty.

Method Precision, Bias, 95% Confidence Interval – Precision: Repeatability depends on the specimen tested. Round robin testing on ASTM E1289 reference specimen produced reproducibility standard deviation of 2 dB or less at all test frequencies 125 Hz to 4000 Hz. **Bias:** No bias in this method as true value is defined by the test method. **95% Confidence Interval:** Facilities and microphone systems produce one-third octave band Transmission Loss measurement uncertainties less than: 80 Hz – 6 dB; 100 Hz – 4 dB; 125 Hz, 160 Hz – 3 dB; 200 Hz, 250 Hz – 2 dB; 315 Hz to 4000 Hz – 1 dB

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AS-TL3555; STC 32 OITC 29

