James Hardie Building Products, Inc.
26300 La Alameda, Suite 250
Mission Viejo, CA 92691

July 27, 2007

Technical Bulletin 07272007

To Whom It May Concern:

Re: Sound Transmission Loss Test Results for, Sound Transmission Class (STC) and Outside/Inside Transmission Class (OITC)

The following ten wall assemblies have been tested to establish sound transmission class (STC) and outside/inside transmission class (OITC). Tests in accordance with ASTM test methods E90, C423, and E413. STC and OITC are listed below:

Sound Transmission Loss Test Assemblies

Assembly #	Report #	Receive Side	Frame Type	Cavity Insulation	Source Side	STC	OITC
1	TL 362A	1/4" HardiTex®	Wood Stud	No cavity insulation	1/2" Thick Regular	38	26
2	TL 363A	1/4" HardiTex®	Wood Stud	Fiberglass insulation	1/2" Thick Regular	39	27
3	TL 335A	1/4" HardiTex®	Metal Stud	No cavity insulation	5/8" Thick Type "X"	45	29
4	TL 366A	1/4" HardiTex®	Metal Stud	Fiberglass insulation	5/8" Thick Type "X"	49	36
5	AS-TL 634A	1/2" HardieBacker™	Metal Stud	Mineral fiber	5/8" Thick Type "X"	43	29
6	AS-TL 2296	1/2" HardieBacker™ with ceramic tile	Metal Stud	Mineral fiber	5/8" Thick Type "X"	50	32
7	AS-TL 2295	1/2" HardieBacker™ with ceramic tile	Wood Stud	Mineral fiber	5/8" Thick Type "X"	37	29
8	AS-TL 633A	1/2" HardieBacker™ with ceramic tile	Wood Stud	Mineral fiber	5/8" Thick Type "X"	39	32
9	TL 364A	HardiePlank™ Lap Siding	Wood Stud	No cavity insulation	1/2" Thick Regular	36	25
10	TL 365A	HardiePlank™ Lap Siding	Wood Stud	Fiberglass insulation	1/2" Thick Regular	40	28

All national, state, and local building code requirements must be followed and where they are more stringent than the JamesHardie® installation requirements, state and local requirements will take precedence.

More detailed information on JamesHardie® product applications are found at http://www.jameshardie.com.
For further clarification, please contact your local sales representative, or, the JamesHardie® Technical Desk at 1-800-942-7343.

Sincerely,
Chad Diercks

Technical Services Manager
James Hardie Building Products

ACOUSTIC SYSTEMS

ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
TL362A

ORIGINAL

Subject: Transmission Loss Test

Date: 15 March, 1990

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

Harditex/Wood Stud/No Cavity Insulation/1/2 inch GWB

for

James Hardie Building Products, Inc.

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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

ASTM E 90 - 85, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"

ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 87, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was examined and found to conform in all observable particulars to the following description provided by the manufacturer:

"The nominally 8 foot by 8 foot x 4-1/2 inch thick wall assembly consists of 2x4 wood framing members spaced 16 inch on center with 2x4 wood framing members as top and bottom plates. The top and bottom plates are fastened to the framing members with 2@ 16d common nails. Exterior cladding consists of a single layer of 1/4 inch thick Harditex Baseboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and at each intermediate framing member 6 inches on center with 1 inch long No. 8 18 self drilling, climaseal coated James Hardie "Green Hornet S" screws. Cladding joints are sealed with an elastomeric joint compound and fiberglass joint tape with screw heads receiving only elastomeric joint compound. Interior sheathing consists of a single layer of 1/2 inch thick regular gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and each intermediate framing member 12 inch on center with 1-1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws. Sheathing joints are sealed with gypsum wallboard joint compound and paper joint tape with screw heads receiving only joint compound."

The weight of the test specimen was 334 pounds, 5.2 pounds per square foot.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening. The perimeter channels of the panels were packed with fiberglass and the joiners were caulked.

DESCRIPTION OF TEST

Broad band pink noise is produced by a loudspeaker in the source chamber. The steady state space time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI 830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C423-84a. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90-87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 14 March, 1990.

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave Band Transmission Loss values are calculated from the 1/3 Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

TL362A James Hardie Building Products, Inc.

Harditex/Wood Stud/No Cavity Insulation/1/2 inch GWB

Frequency	TL [dB]	notes	octave	def'cy
50	17.5 ± 1.3			
63	17.7 ± 0.8		18	
80	20.0 ± 0.8			
100	15.9 ± 1.0			
125	14.6 ± 0.8		16	7
160	18.0 ± 0.6			7
200	24.4 ± 0.4			4
250	26.4 ± 0.5		27	5
315	33.4 ± 0.4			1
400	37.0 ± 0.4			
500	35.4 ± 0.3		37	3
630	39.0 ± 0.2			
800	41.4 ± 0.2			
1000	44.6 ± 0.1		44	
1250	48.3 ± 0.2			
1600	50.7 ± 0.1			
2000	52.5 ± 0.2		52	
2500	52.1 ± 0.1			
3150	47.2 ± 0.1			
4000	43.9 ± 0.2		46	
5000	46.9 ± 0.1			
6300	49.5 ± 0.2			
8000	55.4 ± 0.2		43	
10000	38.5 ± 0.2			

Sound Transmission Class 38

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 22C and 79% relative humidity, and in the source chamber, 22C and 79% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

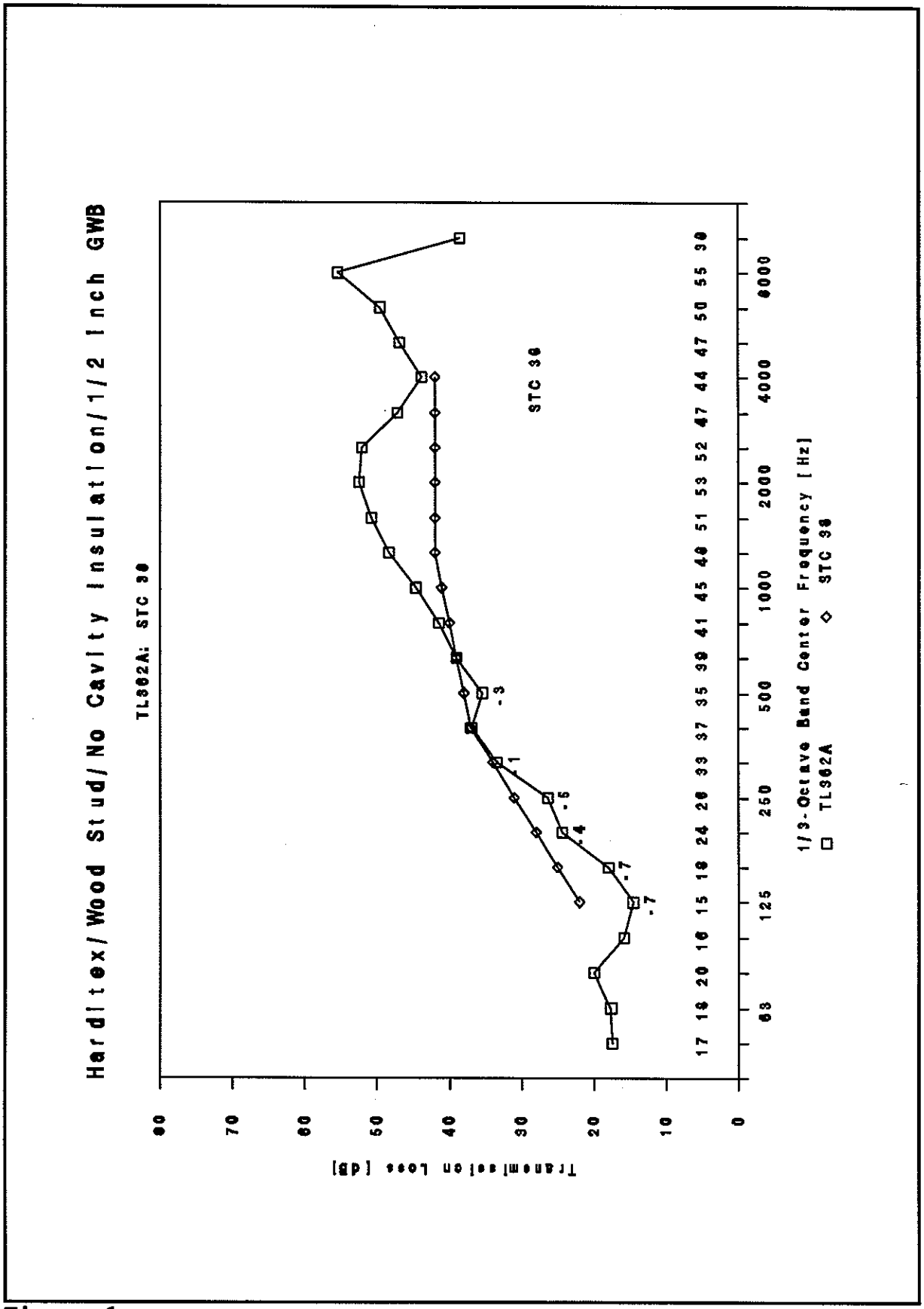
Hardi tex/Wood Stud/No Cavity Insulation/1/2 Inch GWB
TL362A: STC 36
STC 36
Transmission Loss [dB]
1/3-Octave Band Center Frequency [Hz]
TL362A
STC 36
.3
.1
.6
.4
.7
.7

Figure 1

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
AS-TL362A-Addendum

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL362A was performed on 14 March 1990 for James Hardie Building Products of Fontana, California. The specimen under test was a Wood Stud Partition Wall and consisted of 2x4 wood framing members with 1/2-inch gypsum wallboard on the interior face and 1/4-inch Harditex Sheathing Baseboard on the exterior face. The official specimen description is contained in test report AS-TL362A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL362A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL362A is 26. The Sound Transmission Class was 38.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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ACOUSTIC SYSTEMS

ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
TL363A

ORIGINAL

Subject: Transmission Loss Test

Date: 15 March, 1990

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

Harditex/Wood Stud/Cavity Insulation/1/2 inch GWB

for

James Hardie Building Products, Inc.

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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

ASTM E 90 - 85, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"

ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 87, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was examined and found to conform in all observable particulars to the following description provided by the manufacturer:

"The nominally 8 foot by 8 foot by 4-1/2 inch thick wall assembly consists of 2x4 wood framing members spaced 16 inch on center with 2x4 wood framing members as top and bottom plates. The top and bottom plates are fastened to the framing members with 2@ 16d common nails. Exterior cladding consists of a single layer of 1/4 inch thick Harditex Baseboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and at each intermediate framing member 6 inch on center with 1 inch long No. 8-18 self-drilling, climaseal-coated James Hardie "Green Hornet S" screws. Cladding joints are sealed with an elastomeric joint compound and fiberglass joint tape with screw heads receiving only elastomeric joint compound. Insulation batts (4 inch thick by 16 inch wide by 96 inch long R-11 fiberglass sound attenuation blankets - ASTM C665, Type I) are installed snugly into the stud cavities. Interior sheathing consists of a single layer of 1/2 inch thick regular gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and at 1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws. Sheathing joints are sealed with gypsum wallboard joint compound and paper joint tape with screw heads receiving only joint compound."

The weight of the test specimen was 327 pounds, 5.1 pounds per square foot.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening. The perimeter channels of the panels were packed with fiberglass and the joiners were caulked.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C423-84a. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90-87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 14 March, 1990.

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

TL363A James Hardie Building Products, Inc.

Harditex/Wood Stud/Cavity Insulation/1/2 inch GWB

Frequency	TL [dB]	notes	octave	def'cy
50	17.9 ± 1.4			
63	17.2 ± 0.8		18	
80	17.6 ± 0.7			
100	14.1 ± 0.6			
125	14.8 ± 0.8		16	8
160	21.2 ± 0.5			5
200	31.7 ± 0.5			
250	33.9 ± 0.4		34	
315	37.8 ± 0.3			
400	39.2 ± 0.2			
500	37.4 ± 0.5		39	2
630	40.5 ± 0.3			
800	43.2 ± 0.2			
1000	45.2 ± 0.2		45	
1250	49.0 ± 0.2			
1600	51.1 ± 0.2			
2000	52.2 ± 0.2		51	
2500	50.9 ± 0.2			
3150	45.4 ± 0.2			
4000	42.9 ± 0.1		45	
5000	46.2 ± 0.2			
6300	48.4 ± 0.2			
8000	54.7 ± 0.2		43	
10000	38.5 ± 0.3			

Sound Transmission Class 39

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 21C and 41% relative humidity, and in the source chamber, 21C and 41% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

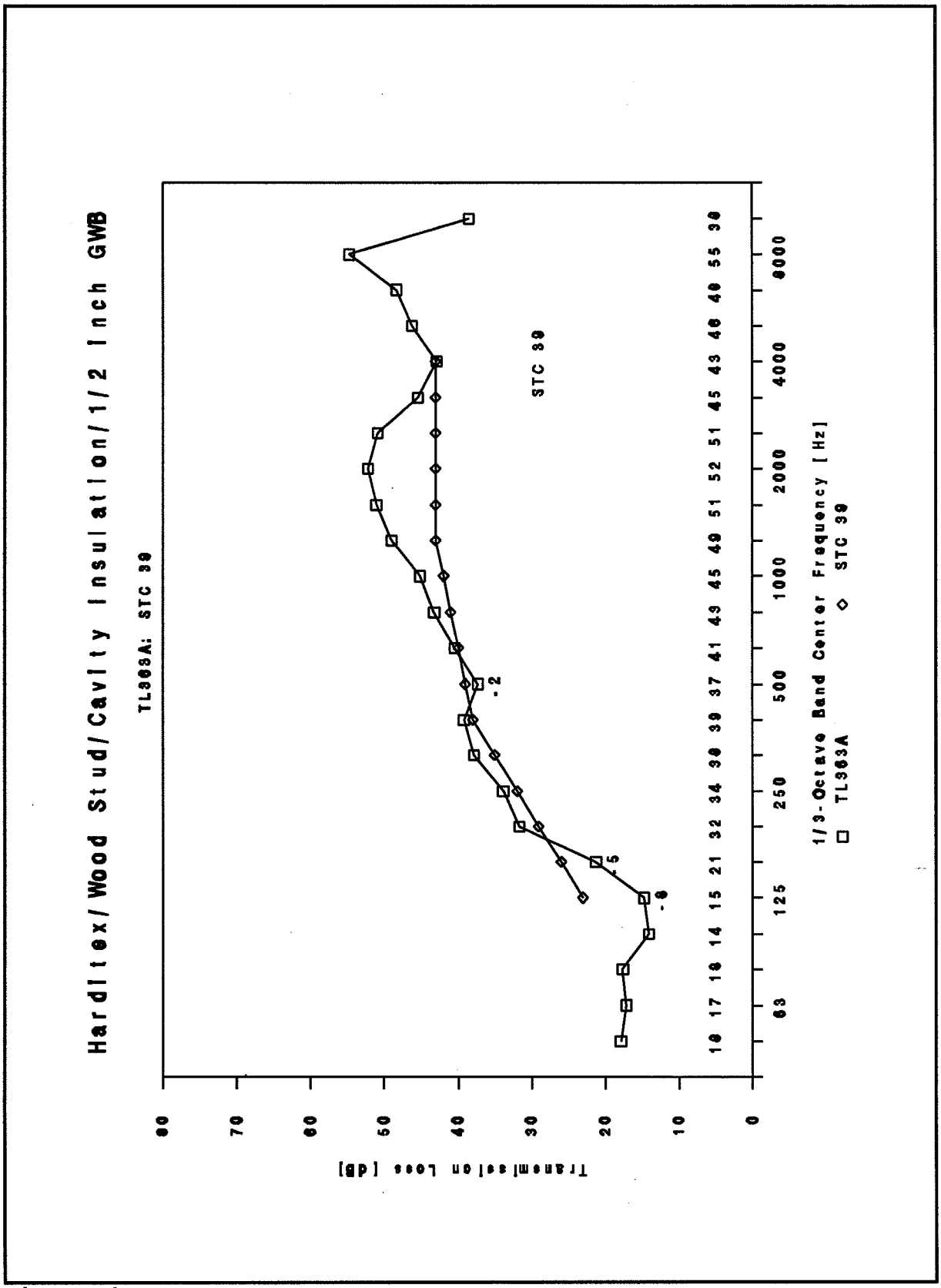
Hardtex/Wood Stud/Cavity Insulation/1/2 Inch GWB
TL363A: STC 39
STC 39
Transmission Loss [dB]
1/3-Octave Band Center Frequency [Hz]
TL363A
STC 39

Figure 1

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
AS-TL363A-Addendum

ACOUSTIC SYSTEMS

ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL363A was performed on 14 March 1990 for James Hardie Building Products of Fontana, California. The specimen under test was a Wood Stud Partition Wall and consisted of 2x4 wood framing members with 1/2-inch gypsum wallboard on the interior face, 4 inch thick R11 glass fiber insulation batts as cavity insulation, and 1/4-inch Harditex Sheathing Baseboard on the exterior face. The official specimen description is contained in test report AS-TL363A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL363A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL363A is 27. The Sound Transmission Class was 39.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
TL335A

ORIGINAL

Subject: Transmission Loss Test

Date: 10-Nov-89

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

"1-Hr. Fire Rated Exterior Wall Assembly"

for

James Hardie Building Products, Inc.

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY
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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

ASTM E 90 - 85, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"

ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 73, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was comprised of one nominal 96 by 96 inch by 5 inch thick asymmetrical wall section constructed of 20 ga. steel C-studs, Type X gypsum wallboard and Harditex Sheathing Baseboard submitted for test by James Hardie Building Products, Inc. (JHBP) of Mission Viejo, California. The weight of the test specimen was 419.5 pounds, 6.6 pounds per square foot.

INTERIOR FACE

One layer of 5/8 inch thick Type "X" (tapered edge) fire resistive gypsum wallboard was applied parallel to one side of 3-5/8 inch 20 ga. corrosion resistant (galvanized) steel "C" studs, spaced 24 inch on center. Attachment of the 5/8 inch thick gypsum wallboard was to the perimeter and field studs with 1-1/4 inch long type "S" HI-LO bugle head drywall screws 8 inches on center around the perimeter and joints, and 12 inches on center in the field. Vertical joints and screw heads were filled with dry joint compound, applied in two coats.

Studs were cut 1/2 inch shorter than full span from the top to the bottom of the runner tracks. Studs were connected to the runner tracks with 1/2 inch long waferhead TEK screw with 0.424" diameter phillips head.

EXTERIOR FACE

One layer of 1/2 inch thick Type "X" (tapered edge) fire resistive gypsum wallboard was applied parallel to one side of the galvanized steel "C" studs. Attachment of the 1/2 inch thick gypsum wallboard was to the perimeter and field studs with 1-1/4 inch long type "S" HI-LO bigle head drywall screws 24 inches on center around the perimeter, along the joints, and in the field.

One layer of 1/4 inch thick Harditex Sheathing Baseboard is applied over the 1/2 inch thick hypsum wallboard layer, parallel to the suds and attached with 2-1/4 inch long type "S-12" "Green Hornet" fasteners spaced 6 inches on center around the perimeter, along the joints and in the field. Vertical joints of the exposed layer and the base layer are staggered 24 inches on center. Vertical joints and screw heads were filled with dry joint compound, applied in two coats.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening with the exterior face to the sound source. Voids between the perimeter of the specimen and the test frame were filled with glass fiber insulation and sealed with dense mastic putty.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C 423-84. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 10-Nov-89 .

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 4. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

JHBP "1-Hr. Fire Rated Wall Assembly"
TL335A

Frequency	TL [dB]	notes	octave	def'cy
50	17.7 ± 1.3			
63	15.6 ± 1.2		14	
80	11.9 ± 0.7			
100	15.8 ± 1.1			
125	26.5 ± 0.5		20	2
160	26.8 ± 0.5			5
200	36.3 ± 0.5			
250	35.5 ± 0.5		36	3
315	36.1 ± 0.2			5
400	39.8 ± 0.4			4
500	39.9 ± 0.2		41	5
630	42.8 ± 0.3			3
800	46.8 ± 0.3			
1000	49.7 ± 0.2		49	
1250	52.0 ± 0.2			
1600	53.6 ± 0.1			
2000	54.0 ± 0.1		52	
2500	49.5 ± 0.2			
3150	46.9 ± 0.1			2
4000	47.5 ± 0.1		48	2
5000	50.4 ± 0.1			
6300	51.8 ± 0.1			
8000	57.2 ± 0.1		55	
10000	61.0 ± 0.2			

Sound Transmission Class 45

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 19C and 66% relative humidity, and in the source chamber, 21C and 33% RH. The precision values tabulated above represent 95% probablity that the true mean value lies within the stated range.

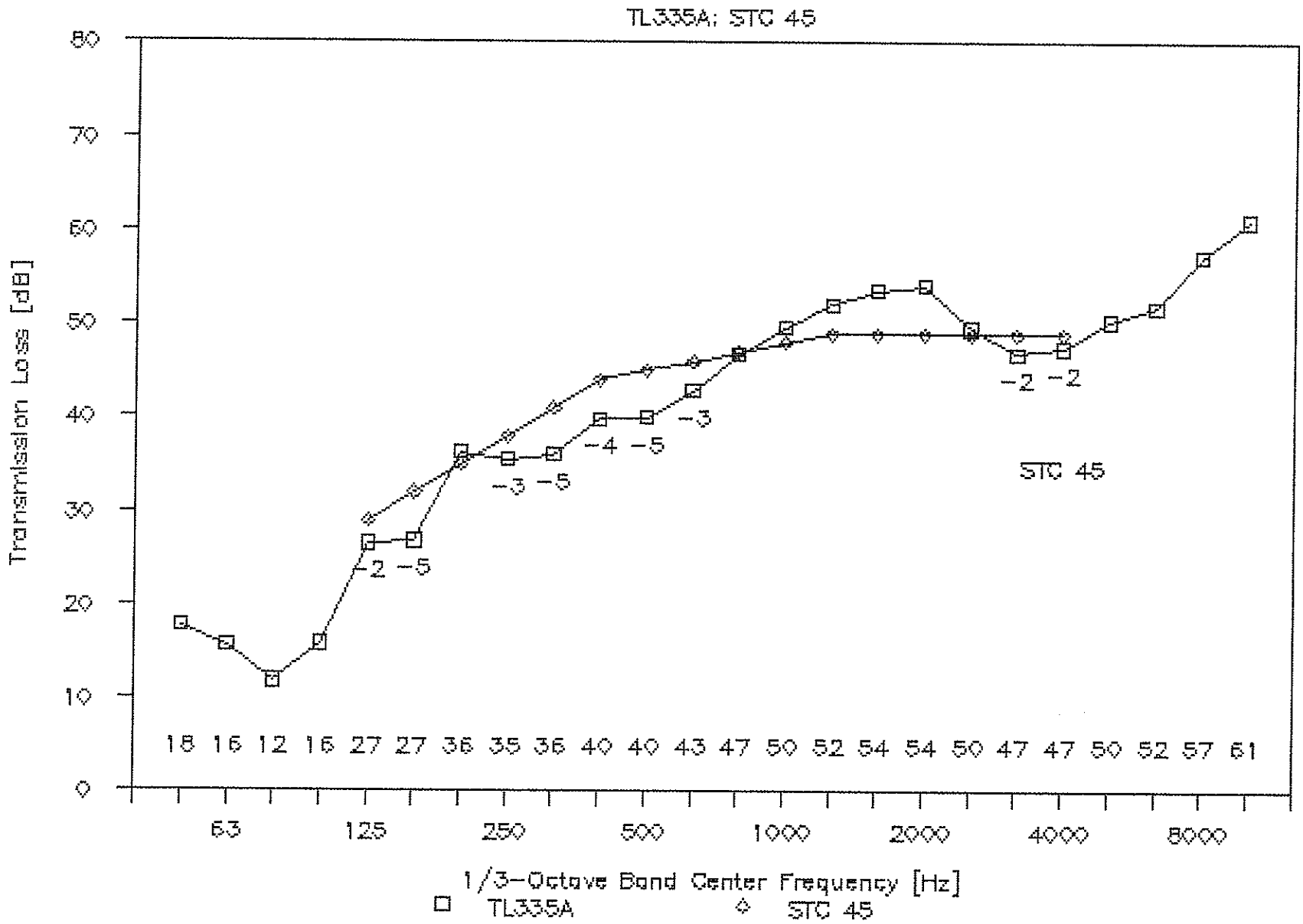
Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

"1-Hr. Fire Rated Wall Assembly"



ACOUSTIC SYSTEMS
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AS-TL335A-Addendum

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL335A was performed on 10 November 1989 for James Hardie Building Products of Fontana, California. The specimen under test was designated "1-Hour Fire-Rated Exterior Wall Assembly" and consisted of 20 gage 3-5/8 inch thick metal studs with 5/8-inch Type X gypsum wallboard on the interior face and 1/2-inch Type X gypsum wallboard on the exterior face, which was in turn covered with 1/4-inch Harditex Sheathing Baseboard. The official specimen description is contained in test report AS-TL335A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL335A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL335A is 29. The Sound Transmission Class was 45.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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OFFICIAL LABORATORY REPORT
TL366A

ORIGINAL

Subject: Transmission Loss Test

Date: 15 March, 1990

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Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

Harditex/1/2 inch GWB/Metal Stud/
Cavity Insulation/5/8 inch GWB

for

James Hardie Building Products, Inc.

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY
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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

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ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 87, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was examined and found to conform in all observable particulars to the following description provided by the manufacturer:

"The nominally 8 foot by 8 foot by 5-1/4 inch thick wall assembly consists of No. 20 gauge 3-5/8 inch by 1-5/8 inch corrosion-resistant metal "C" stud framing members spaced 24 inch on center with No. 20 gauge 3-5/8 inch x 1-5/8 inch corrosion-resistant metal "C" track members as top and bottom plates. The top and bottom plates are not fastened to the framing members. Interior sheathing consists of a single layer of 5/8 inch thick Type "X" gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter framing members 8 inch on center and at each intermediate framing member 8 inch on center with 1-1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws. Sheathing joints are sealed with gypsum wallboard joint compound and paper joint tape with screw heads receiving only joint compound. Insulation batts (4 inch thick by 24 inch wide by 96 inch long R-11 fiberglass sound attenuation blankets - ASTM C665, Type I) are installed snugly into the stud cavities. Exterior cladding consists of: 1) a single layer of 1/2 inch thick Type "X" gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter framing members and at each intermediate framing member 24 inch on center with 1-1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws, and 2) a single layer of 1/4 inch thick Harditex Baseboard (2 sheets nominally 4 foot by 8 foot) installed vertically and staggered (offset 24 inches from the GWB) and fastened at the perimeter and at each intermediate framing member 6 inch on center with 1-1/4 inch long No. 8-18 self-

drilling, climaseal-coated James Hardie "Green Hornet S-12" screws. Cladding joints are sealed with an elastomeric joint compound and fiberglass joint tape with screw heads receiving only elastomeric joint compound."

The weight of the test specimen was 423 pounds, 6.6 pounds per square foot

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening. The perimeter channels of the panels were packed with fiberglass and the joiners were caulked.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in t^Xx receiving room was measured in accordance with ASTM C423-84a. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 14 March, 1990 .

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

TL366A James Hardie Building Products, Inc.

Harditex/1/2 inch GWB/Metal Stud/Cavity Insulation/5/8 inch GWB

Frequency	TL [dB]	notes	octave	def'cy
50	17.5 ± 0.8			
63	13.7 ± 1.0		16	
80	18.4 ± 0.5			
100	27.4 ± 0.6			
125	35.3 ± 0.9		31	
160	37.4 ± 0.8			
200	34.5 ± 0.7			5
250	35.9 ± 0.5		36	6
315	40.6 ± 0.5			4
400	42.5 ± 0.4			5
500	46.1 ± 0.2		45	3
630	49.0 ± 0.3			1
800	53.3 ± 0.2			
1000	55.1 ± 0.2		55	
1250	57.4 ± 0.2			
1600	58.2 ± 0.2			
2000	58.7 ± 0.2		57	
2500	55.4 ± 0.1			
3150	52.3 ± 0.1			1
4000	50.3 ± 0.1		51	3
5000	52.1 ± 0.1			
6300	54.4 ± 0.1			
8000	58.4 ± 0.1		57	
10000	62.8 ± 0.2			

Sound Transmission Class 49

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 22C and 79% relative humidity, and in the source chamber, 22C and 79% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

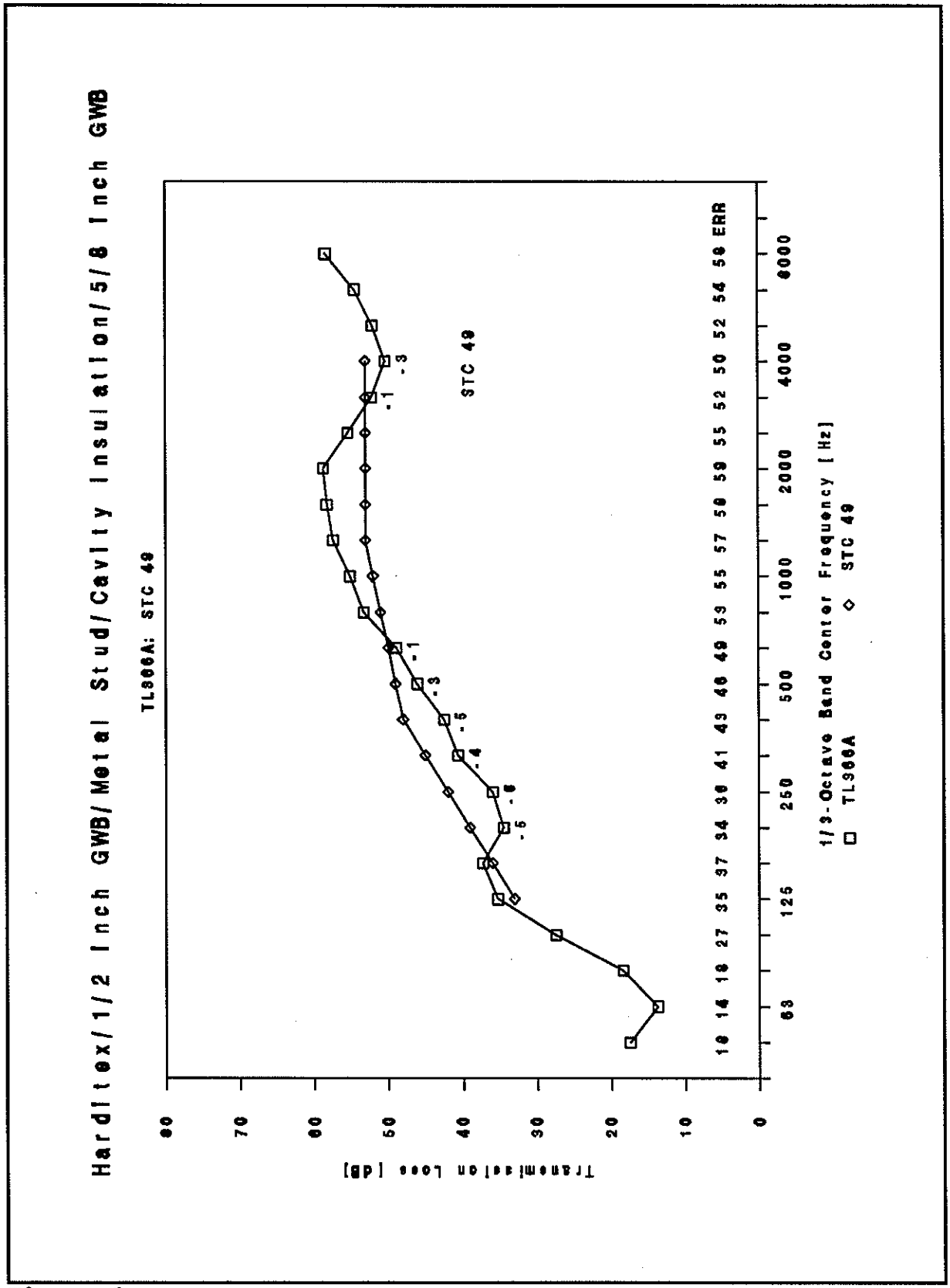
Hardtex/1/2 Inch GWB/Metal Stud/Cavity Insulation/5/8 Inch GWB
TL366A: STC 49
STC 49
Transmission Loss [dB]
80
70
60
50
40
30
20
10
0
10 14 18 27 35 37 34 38 41 43 46 49 53 55 57 58 59 55 52 50 52 54 56 ERR
63 125 250 500 1000 2000 4000 8000
1/3-Octave Band Center Frequency [Hz]
TL366A
STC 49
-1
-3
-1
-3
-5
-4
-6
-5

Figure 1

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
AS-TL366A-Addendum

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL366A was performed on 14 March 1990 for James Hardie Building Products of Fontana, California. The specimen under test was a Metal Stud Wall Partition and consisted of 20 gage 3-5/8 inch thick metal studs with 5/8-inch Type X gypsum wallboard on the interior face, 4 inch thick R11 glass fiber batts for cavity insulation, and 1/2-inch Type X gypsum wallboard on the exterior face, which was in turn covered with 1/4-inch Harditex Sheathing Baseboard. The official specimen description is contained in test report AS-TL366A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL366A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL366A is 36. The Sound Transmission Class was 49.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-TL634A

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Sound Transmission Loss Test

Date: 15 September, 1992

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

7/16" Hardibacker Non-Load-Bearing Steel Stud Wall

for

James Hardie Building Products

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY is NVLAP-Accredited for this and other test procedures

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INTRODUCTION

"The 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." [ASTM E90 - 90]

APPLICABLE STANDARDS

ASTM E 90 - 90, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
ASTM C 423 - 90a, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"
ASTM E 413 - 87, "Classification for Sound Insulation Rating"
ASTM E 1332 - 90, "Classification for Determination of Outdoor-Indoor Transmission Class"

SPECIMEN DESCRIPTION

The specimen consisted of a 2440 by 2440 mm by 120 mm thick *[96 by 96 by 4-3/4 inch]* steel stud load-bearing wall constructed at Omega Point Laboratories of San Antonio, Texas, and designated "7/16-inch Hardibacker® Load-Bearing Wood Stud Wall" and submitted for test by James Hardie Building Products, Inc. of Fontana, California. The following description is drawn from Omega Point Laboratories Project No. 11710-92783 report.

The wall was constructed using nominal 35 by 92 mm *[1-3/8 by 3-5/8]* by 0.6 mm thick *[24 gage, 0.0245 inch]* galvanized steel studs with 8 mm *[5/16 inch]* folded back return flange legs. Studs were cut 19 mm *[3/4 inch]* less than the full assembly height. Stud spacing was 405 mm *[16 inches]* on center. Floor and Ceiling Runners were of the same construction.

One side of the wall was then covered with a single layer of 16 mm *[5/8 inch]* thick Type X gypsum drywall (James Hardie Building Products, Hardirock®), attached to the studs with minimum 25 mm *[1 inch]* long Type S bugle philips head gypsum board screws, spaced 205 mm *[8 inches]* o.c. along the edges of the board and 305 mm *[12 inches]* in the field. All nail heads and joints were covered with gypsum compound and/or paper joint tape as appropriate.

The stud cavities were then filled with unfaced mineral fiber batts, nominal 90 mm *[3.5 inches]* and 50 kg/m^3 *[3 pounds per cubic foot]* density, held in by compression only. Vertical joints between batts were staggered between stud cavities.

The remaining side of the wall was covered with a single layer of 11 mm *[7/16 inch]* thick Hardibacker® non-asbestos fiber-cement underlayment, attached to studs with 25 mm *[1 inch]* long No. 8-18 x 0.323 in. HD ribbed bugle screws (1 in. Green Hornet™), spaced 150 mm *[6 inches]* o.c. around all perimeters and studs. Joints were covered with glass fiber mesh tape. All nail heads and joints were filled with joint compound.

No load was applied to the wall assembly at the time of the test. The mass *[weight]* of the panel was 194 kg *[427 pounds]*.

TEST SPECIMEN MOUNTING

The specimen was mounted in an opening in the high transmission loss filler wall installed in the 2440 by 2440 mm transmission loss test opening. The perimeter of the panel was packed with fiberglass and the face of the panel was sealed to the edge of the test aperture. The calculated transmission loss of the composite (test specimen and filler wall) was adjusted to account for the sound power transmitted through the filler wall.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C 423-90a. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 90. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 19 August, 1992.

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

James Hardie Building Products 7/16" Hardibacker Non-Load-Bearing Steel Stud Wall
AS-TL634A

Frequency	TL [dB]	notes	octave
50	19.8 ± 0.9		
63	17.4 ± 0.8		19
80	18.8 ± 0.4		
100	15.9 ± 0.5		
125	19.1 ± 1.6		19
160	24.6 ± 0.7		
200	31.6 ± 0.8		
250	42.5 ± 0.4		36
315	42.5 ± 0.4		
400	44.9 ± 0.4		
500	48.9 ± 0.3		48
630	53.3 ± 0.2		
800	54.1 ± 0.1		
1000	55.3 ± 0.2		55
1250	56.1 ± 0.2		
1600	53.7 ± 0.2		
2000	44.0 ± 0.1		44
2500	41.7 ± 0.1		
3150	46.0 ± 0.1		
4000	50.2 ± 0.1		49
5000	55.5 ± 0.1		
6300	57.6 ± 0.1		
8000	61.6 ± 0.2		60
10000	63.8 ± 0.1		

Sound Transmission Class 43
Outdoor-Indoor Transmission Class 29

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 18C and 75% relative humidity, and in the source chamber, 18C and 34% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By

Santos J. Salinas
Laboratory Technician [in Training]

Supervised and Respectfully Submitted,

David Nelson
Laboratory Technical Director

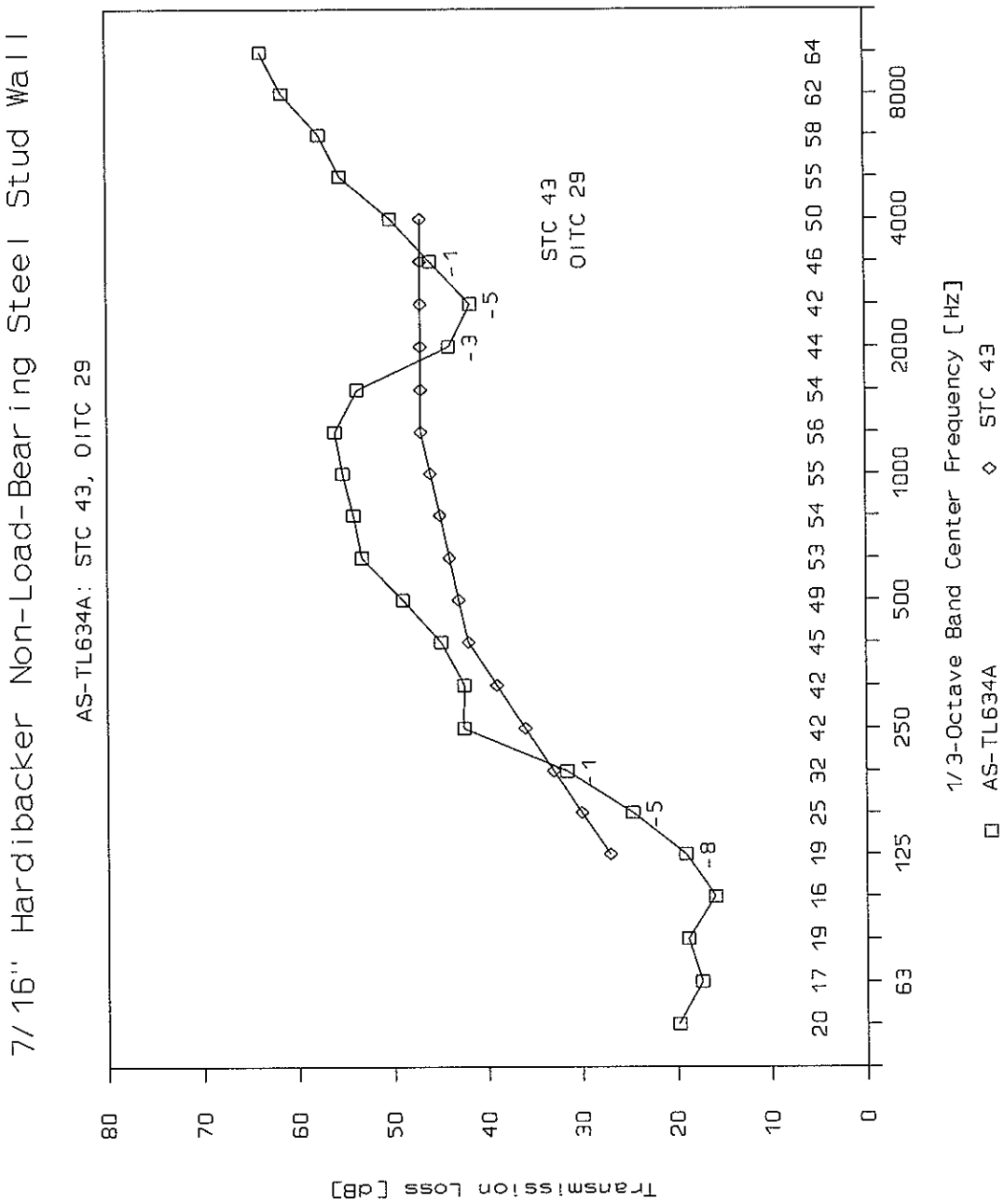

Figure 1

ACOUSTIC SYSTEMS

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-TL2296

Subject: **Sound Transmission Loss Test**

Date: August 5, 2003

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

on

Asymmetrical Non-Loadbearing Fire-rated Wall Assembly w/13/32" Hardibacker 500® Backerboard, 25 ga. Steel Studs, 5/8" Type X Gypsum Board, and Cavity Insulation

for

James Hardie Building Products

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY is NVLAP-Accredited for this and other test procedures.

National Institute of Standards and Technology

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INTRODUCTION

The 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 90-99 "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"
ASTM E 413-87 (1999) "Classification for Sound Insulation Rating"
ASTM E 1332-90 (1998) "Classification for Determination of Outdoor-Indoor Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was a asymmetrical non-loadbearing wall assembly whose dimensions were 2438 mm in length by 2438 mm in width by 127 mm in depth *[96 by 96 by 5 inches]*. The test specimen was designed, fabricated, submitted for test, and designated "Asymmetrical Non-Loadbearing Fire-rated Wall Assembly w/13/32" Hardibacker 500® Backerboard, 25 ga. Steel Studs, 5/8" Type X Gypsum Board, and Cavity Insulation" by James Hardie Building Products of Fontana, CA. Personnel from OMEGA POINT Laboratories of San Antonio, TX, independently witnessed the fabrication of the test specimen and verified the following specimen description provided by the manufacturer. James Hardie personnel fabricated the wall specimen the week of 23 June 2003. OMEGA POINT Laboratories subsequently stored the test specimen at their facilities and transported it to Acoustic Systems Acoustical Research Facility on 01 August 2003.

Receive (Tiled) Side - One layer of 10.5 mm *[13/32 inch]* thick Hardibacker 500® backerboard applied perpendicular (horizontally) to 0.53 mm *[25ga.]* by 92 mm *[3-5/8 inches]* steel studs 406 mm *[16 inches]* on-center (o.c.) with minimum 25.4 mm *[1 inch]* long by 8.2 mm *[0.323 inch]* HD C-Drill® screws 203.2 mm *[8 inches]* o.c. at floor and ceiling runners and intermediate studs. Fasteners placed approximately 51 mm *[2 inches]* in from panel corners and approximately 9.5 mm *[3/8 inch]* in from panel edges.

Joint Treatment and Tile Finish - Horizontal joints of the Hardibacker 500® backerboard were bedded and taped with standard latex-modified thinset mortar and glass fiber mesh joint tape. Subsequently, the prepared wall surface was covered with nominal 4¼ " by 4¼ " standard grade ceramic wall tile bonded with standard latex-modified thinset mortar and grouted with standard non-sanded tile grout. The wall assembly was allowed to cure beyond the required 28-day minimum before testing. Both bonding mortar and grout were mixed in accordance with manufacturer's written directions on the bag and in compliance with all applicable ANSI A108 and A118 Standards. Tile installation was accomplished using a local tile contractor familiar with these requirements.

Insulation - Stud cavities filled with Rockwool® 76 mm *[3 inch]* thick, 48 kg/m^3 *[3 pcf]*, unfaced, friction-fit mineral fiber insulation batts complying with ASTM C665, Type I.

Source (Untiled) Side - One (1) layer of 15.9 mm *[5/8 inch]* thick Type X gypsum board applied perpendicular (horizontally) to 0.53 mm *[25ga.]* by 92 mm *[3-5/8 inches]* steel studs 406 mm *[16 inches]* o.c. with minimum 32 mm *[1-1/4 inches]* long Type S drywall screws 203.2 mm *[8 inches]* o.c. at floor and ceiling runners and intermediate studs. Fasteners placed approximately 51 mm *[2 inches]* in from panel corners and approximately 9.5 mm *[3/8 inch]* in from panel edges.

Joint Treatment - Chemically-setting powder gypsum joint compound, complying with ASTM Specification C 475, was utilized for flush joining the panel edges. Setting-type compound mixed in accordance with manufacturers written instructions. Compound applied to fastener heads and joint recess formed by adjoining sheets. Paper reinforcing tape imbedded centrally into the joints. Paper reinforcing tape immediately imbedded with additional compound and allowed to dry.

The weight of the test specimen was measured to be 259.7 kg *[572 pounds]*, giving a weight per unit area of 43.7 kg/m^2 *[8.9 pounds/ft^2]*.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 2440 mm by 2440 mm transmission loss test opening. The perimeter of the specimen was packed with glass fiber insulation and the face of the specimen was sealed to the edge of the test aperture with dense mastic putty. The calculated transmission loss of the assembly was adjusted to account for any sound power transmitted through facility boundaries.

DESCRIPTION OF TEST

Two (2) loudspeakers in a 200 cubic meter reverberation chamber, designated as the "Source Room", produced broadband pink noise. A 254 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 NI-830 Dual Channel Real Time Analyzer. Sound absorption in the Receive Room was determined by reverberation time measurements. The precision of the resulting calculated Sound Transmission Loss varies with frequency band and is included in the Data Table that follows. The test was performed in accordance with ASTM E90-99 except where discussed. This test took place at **ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY**, Austin, Texas, on August 5, 2003.

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TRANSMISSION LOSS DATA

The 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 12.4 of ASTM E90-99.

James Hardie Building Products – Asymmetrical Non-Loadbearing Fire-rated Wall Assembly w/13/32" Hardibacker 500® Backerboard, 25 ga. Steel Studs, 5/8" Type X Gypsum Board, and Cavity Insulation

1/3 Octave Band Center Freq (Hz)	Transmission Loss (dB)	Uncertainty (+/- dB)	Notes	Octave Band TL (dB)	STC Deficiencies
50	20		[g]		
63	20		[g]	19	
80	17	1.8	[g]		
100	18	2.1			
125	26	2.6		22	8
160	34	1.6			3
200	39	1.2			1
250	45	1.0		43	
315	49	0.6			
400	50	0.7			
500	55	0.6		53	
630	58	0.5			
800	57	0.4			
1000	56	0.4		55	
1250	52	0.4			2
1600	51	0.3			3
2000	51	0.3		49	3
2500	48	0.3			6
3150	51	0.3			3
4000	54	0.2		53	
5000	58	0.3			
6300	61	0.4			
8000	63	0.5	[c]	62	
10000	65	0.8	[a][c]		
STC	**50**				
OITC	**32**				

Note: Reverberation times are calculated based on the first 20 dB of decay after a minimum 100ms drop. Acoustic Systems maintains in its files quality assurance documentation indicating the result magnitude and uncertainty are consistent with calculation methods of Section 11.4.1 of ASTM E 90-99. [a]: Receive room SPL corrected for background noise; [b]: Receive room SPL too close to ambient. Correction of 2 dB applied and result represents lower bound for TL in this band; [c]: Correction made for flanking transmission; [d]: Transmission Loss of specimen too close to facility limit. No facility correction applied and result represents lower bound for TL in this band; [e]: Transmission Loss of specimen too close to filler wall. Result represents lower bound for TL in this band; [f]: Insufficient precision to meet requirements of Section A2.2 of ASTM E 90-99; [g] An insufficient number of statistically independent samples are available in the band to determine precision.

During the test, environmental conditions in the Receive Room were 24.7C with 73.4% relative humidity. Conditions in the Source Room were 24.7C with 74.1% relative humidity. The precision values [±] tabulated above represent 95% probability that the true mean value lies within the stated range.

Respectfully Submitted,

Michael C. Black
Laboratory Technical Director

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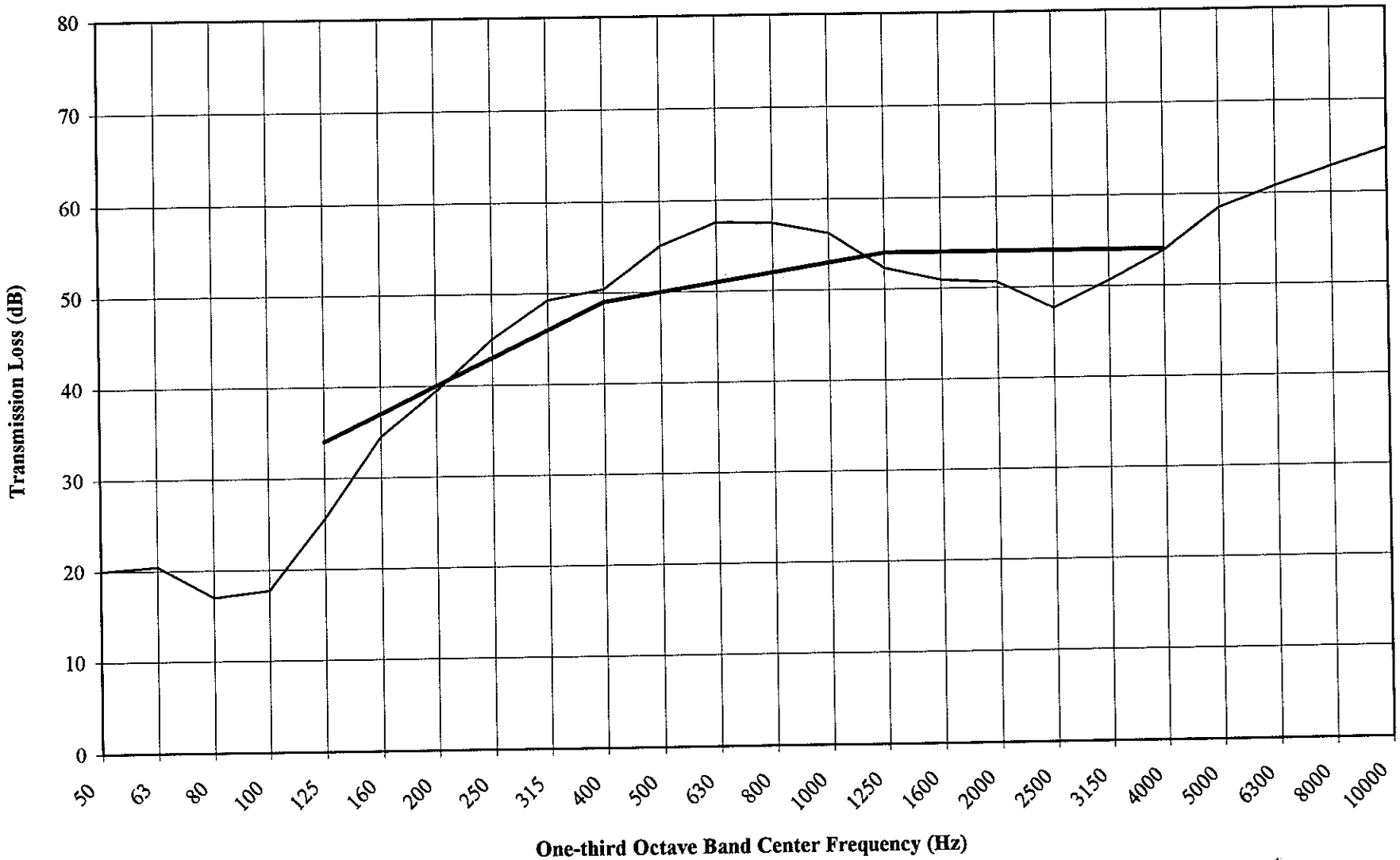
James Hardie Building Products - Asymmetrical Non-Loadbearing Fire-rated Wall Assembly w/13/32" Hardibacker 500® Backerboard, 25 ga. Steel Studs, 5/8" Type X Gypsum Board, and Cavity Insulation *AS-TL2296; STC 50 OITC 32*



ACOUSTIC SYSTEMS

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ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-TL2295

Subject: **Sound Transmission Loss Test**

Date: August 5, 2003

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

on

Asymmetrical Limited Loadbearing Fire-rated Wall Assembly w/ 13/32" Hardibacker 500® Backerboard, 2" x 4" Wood Studs, 5/8" Type X Gypsum Board, and Cavity Insulation

for

James Hardie Building Products

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY is NVLAP-Accredited for this and other test procedures.

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INTRODUCTION

The 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 90-99 "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"
ASTM E 413-87 (1999) "Classification for Sound Insulation Rating"
ASTM E 1332-90 (1998) "Classification for Determination of Outdoor-Indoor Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was a asymmetrical limited loadbearing wall assembly whose dimensions were 2438 mm in length by 2438 mm in width by 127 mm in depth *[96 by 96 by 5 inches]*. The test specimen was designed, fabricated, submitted for test, and designated "Asymmetrical Limited Loadbearing Fire-rated Wall Assembly w/ 13/32" Hardibacker 500® Backerboard, 2" x 4" Wood Studs, 5/8" Type X Gypsum Board, and Cavity Insulation" by James Hardie Building Products of Fontana, CA. Personnel from OMEGA POINT Laboratories of San Antonio, TX, independently witnessed the fabrication of the test specimen and verified the following specimen description provided by the manufacturer. James Hardie personnel fabricated the wall specimen the week of 23 June 2003. OMEGA POINT Laboratories subsequently stored the test specimen at their facilities and transported it to Acoustic Systems Acoustical Research Facility on 01 August 2003.

Receive (Tiled) Side - One (1) layer of 10.5 mm *[13/32 inch]* thick Hardibacker 500® backerboard applied perpendicular (horizontally) to nominal 2" x 4" wood studs 406 mm *[16 inches]* on-center (o.c.) with two (2) top plates and a single bottom plate and with minimum 38 mm *[1-1/2 inches]* long by 9.5 mm *[0.375 inch]* HD corrosion-resistant roofing nails 203.2 mm *[8 inches]* o.c. at floor and ceiling runners and intermediate studs. Fasteners placed approximately 51 mm *[2 inches]* in from panel corners and approximately 9.5 mm *[3/8 inch]* in from panel edges.

Joint Treatment and Tile Finish - Horizontal joints of the Hardibacker 500® backerboard were bedded and taped with standard latex-modified thinset mortar and glass fiber mesh joint tape. Subsequently, the prepared wall surface was covered with nominal 4¼ " by 4¼ " standard grade ceramic wall tile bonded with standard latex-modified thinset mortar and grouted with standard non-sanded tile grout. The wall assembly was allowed to cure beyond the required 28 day minimum before testing. Both the bonding mortar and the grout were mixed in accordance with the manufacturer's written directions on the bag and in compliance with all applicable ANSI A108 and A118 Standards. Tile installation was accomplished using a local tile contractor familiar with these requirements.

Insulation - Stud cavities filled with Rockwool® 76 mm *[3 inch]* thick, 48 kg/m^3 *[3 pcf]*, unfaced, friction-fit mineral fiber insulation batts complying with ASTM C665, Type I.

Source (Untiled) Side - One layer of 15.9 mm *[5/8 inch]* thick Type X gypsum board applied perpendicular (horizontally) to nominal 2" x 4" wood studs 406 mm *[16 inches]* o.c. with two (2) top plates and a single bottom plate and with minimum 22 mm *[1-7/8 inches]* long cup-head gypsum board nails 203.2 mm *[8 inches]* o.c. at floor and ceiling runners and intermediate studs. Fasteners placed approximately 51 mm *[2 inches]* in from panel corners and approximately 9.5 mm *[3/8 inch]* in from panel edges

Joint Treatment - Chemically-setting powder gypsum joint compound complying with ASTM Specification C 475, was utilized for flush joining the panel edges. Setting-type compound mixed in accordance with manufacturer's written instructions. Compound applied to fastener heads and joint recess formed by adjoining sheets. Paper reinforcing tape imbedded centrally into the joints. Paper reinforcing tape immediately imbedded with additional compound and allowed to dry.

The weight of the test specimen was measured to be 290.1 kg *[639 pounds]*, giving a weight per unit area of 48.8 kg/m^2 *[10.0 pounds/ft^2]*.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 2440 mm by 2440 mm transmission loss test opening. The perimeter of the specimen was packed with glass fiber insulation and the face of the specimen was sealed to the edge of the test aperture with dense mastic putty. The calculated transmission loss of the assembly was adjusted to account for any sound power transmitted through facility boundaries.

DESCRIPTION OF TEST

Two (2) loudspeakers in a 200 cubic meter reverberation chamber, designated as the "Source Room", produced broadband pink noise. A 254 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 NI-830 Dual Channel Real Time Analyzer. Sound absorption in the Receive Room was determined by reverberation time measurements. The precision of the resulting calculated Sound Transmission Loss varies with frequency band and is included in the Data Table that follows. The test was performed in accordance with ASTM E90-99 except where discussed. This test took place at **ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY**, Austin, Texas, on August 5, 2003.

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TRANSMISSION LOSS DATA

The 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 12.4 of ASTM E90-99.

James Hardie Building Products – Asymmetrical Limited Loadbearing Fire-rated Wall Assembly w/ 13/32" Hardibacker 500® Backerboard, 2" x 4" Wood Studs, 5/8" Type X Gypsum Board, and Cavity Insulation

1/3 Octave Band Center Freq (Hz)	Transmission Loss (dB)	Uncertainty (+/- dB)	Notes	Octave Band TL (dB)	STC Deficiencies
50	23		[d][g]		
63	28		[d][g]	25	
80	26	2.0	[g]		
100	23	2.1			
125	25	3.0		21	
160	19	1.5			5
200	19	0.7			8
250	31	1.0		24	
315	37	0.7			
400	35	0.6			1
500	37	0.5		37	
630	43	0.5			
800	44	0.4			
1000	43	0.4		43	
1250	42	0.3			
1600	43	0.3			
2000	43	0.3		43	
2500	43	0.3			
3150	49	0.3			
4000	53	0.2		52	
5000	58	0.3			
6300	61	0.4			
8000	64	0.5	[a][c]	63	
10000	66	0.8	[a]		
STC	37				
OITC	29				

Note: Reverberation times are calculated based on the first 20 dB of decay after a minimum 100ms drop. Acoustic Systems maintains in its files quality assurance documentation indicating the result magnitude and uncertainty are consistent with calculation methods of Section 11.4.1 of ASTM E 90-99. [a]: Receive room SPL corrected for background noise; [b]: Receive room SPL too close to ambient. Correction of 2 dB applied and result represents lower bound for TL in this band; [c]: Correction made for flanking transmission; [d]: Transmission Loss of specimen too close to facility limit. No facility correction applied and result represents lower bound for TL in this band; [e]: Transmission Loss of specimen too close to filler wall. Result represents lower bound for TL in this band; [f]: Insufficient precision to meet requirements of Section A.2.2 of ASTM E 90-99; [g] An insufficient number of statistically independent samples are available in the band to determine precision.

During the test, environmental conditions in the Receive Room were 24.3C with 74.4% relative humidity. Conditions in the Source Room were 24C with 74% relative humidity. The precision values [±] tabulated above represent 95% probability that the true mean value lies within the stated range.

Respectfully Submitted,

Michael C. Black
Laboratory Technical Director

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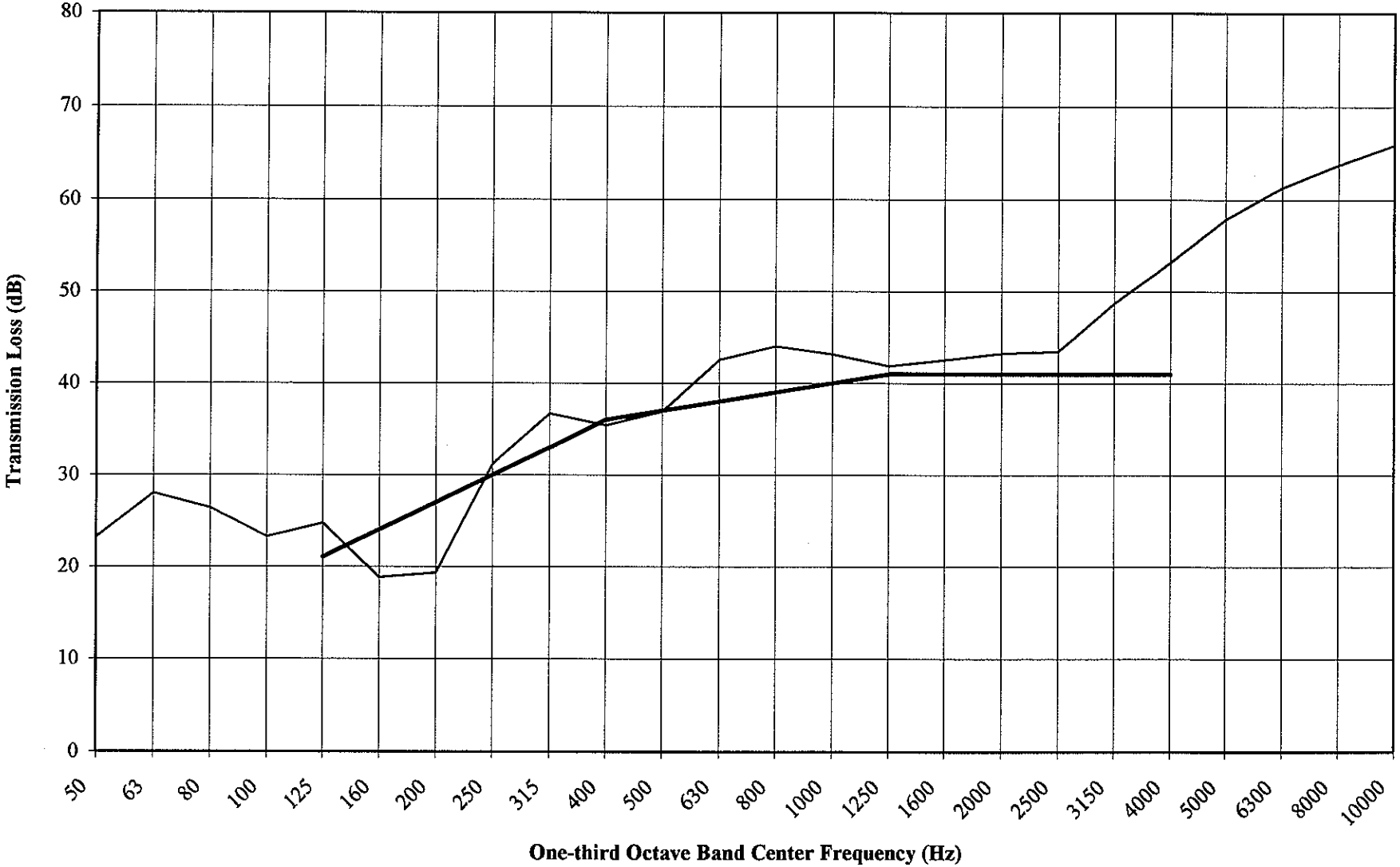
James Hardie Building Products - Asymmetrical Limited Loadbearing Fire-rated Wall Assembly w/ 13/32" Hardibacker 500® Backerboard, 2" x 4" Wood Studs, 5/8" Type X Gypsum Board, and Cavity Insulation ***AS-TL2295; STC 37 OITC 29***



ACOUSTIC SYSTEMS

NVLAP® NVLAP LAB CODE 100286-0

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-TL633A

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Sound Transmission Loss Test

Date: 15 September, 1992

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

7/16"-Hardibacker Load-Bearing Wood Stud Wall

for

James Hardie Building Products

ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY is NVLAP-Accredited for this and other test procedures

National Institute of Standards and Technology

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INTRODUCTION

"The 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." [ASTM E90 - 90]

APPLICABLE STANDARDS

ASTM E 90 - 90, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
ASTM C 423 - 90a, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"
ASTM E 413 - 87, "Classification for Sound Insulation Rating"
ASTM E 1332 - 90, "Classification for Determination of Outdoor-Indoor Transmission Class"

SPECIMEN DESCRIPTION

The specimen consisted of a 2440 by 2440 mm by 125 mm thick *[96 by 96 by 5 inch]* wood stud load-bearing wall constructed at Omega Point Laboratories of San Antonio, Texas, and designated "7/16-inch Hardibacker® Load-Bearing Wood Stud Wall" and submitted for test by James Hardie Building Products, Inc. of Fontana, California. The following description is drawn from Omega Point Laboratories Project No. 11710-92851 report.

The wall was constructed using nominal 2 by 4 No. 1 Grade Douglas Fir - Larch members *(actual dimensions 38 by 89 mm, 1.5 by 3.5 inches)* with two top plates and single bottom plate. Horizontal cross-bracing was installed along the vertical centerline. All connections were fastened with two 16d common nails.

One side of the wall was then covered with a single layer of 16 mm *[5/8 inch]* thick Type X gypsum drywall, positioned vertically and attached to the studs with 48 mm *[1-7/8 inch]* long cup-head, drywall nails spaced 180 mm *[7 inches]* o.c. along all studs and plates. All nail heads and joints were covered with gypsum compound and/or paper joint tape as appropriate.

The stud cavities were then filled with unfaced mineral fiber batts, nominal 90 mm *[3.5 inches]* and 50 kg/m^3 *[3 pounds per cubic foot]* density, held in by compression only. Vertical joints between batts were staggered between stud cavities.

The remaining side of the wall was covered with a single layer of 11 mm *[7/16 inch]* thick Hardibacker® fiber-cement underlayment, held in place with 38 mm *[1-1/2 inch]* long corrosion resistant (galvanized) roofing nails, spaced 150 mm *[6 inches]* o.c. around all perimeters and studs. All nail heads and joints were covered with gypsum compound and/or paper joint tape as appropriate.

The side of the wall with Hardibacker® was then covered with nominal 100 mm *[4 inch]* square ceramic tile held in place with standard file mortar. The mortar was allowed to set for a minimum of four hours prior to application of the grout. The spaces between the tiles were then filled with grout and the wall assembly allowed to cure for at least two weeks. Both the mortar and the grout were mixed in accordance with the manufacturer's directions on the bags. The entire installation was accomplished using local contractors familiar with that type of work. The nominal thickness of the tile was 8 mm *[0.317 inch]*, with the mortar and grout the overall thickness was approximately 13 mm *[1/2 inch]*.

No load was applied to the wall assembly at the time of the test. The mass *[weight]* of the panel was 332 kg *[730 pounds]*.

TEST SPECIMEN MOUNTING

The specimen was mounted directly into and completely filled the 2440 by 2440 mm transmission loss test opening. The perimeter of the panel was sealed to the edges of the test aperture by means of closed cell rubber seals in compression provided by steel angles.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C 423-90a. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 90. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 18 August, 1992.

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

James Hardie Building Products 7/16" Hardibacker Load-Bearing Wood Stud Wall
AS-TL633A

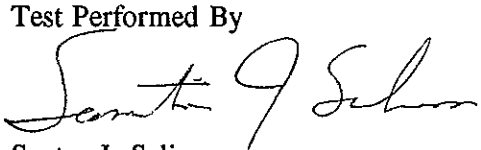
Frequency	TL [dB]	notes	octave
50	25.9 ± 1.7		
63	25.1 ± 0.7		25
80	24.2 ± 0.5		
100	21.6 ± 0.9		
125	25.2 ± 0.5		23
160	22.9 ± 0.4		
200	23.8 ± 0.7		
250	32.0 ± 0.3		28
315	37.5 ± 0.2		
400	36.1 ± 0.3		
500	34.8 ± 0.2		36
630	39.1 ± 0.3		
800	37.9 ± 0.2		
1000	39.9 ± 0.2		40
1250	41.7 ± 0.1		
1600	42.2 ± 0.1		
2000	41.4 ± 0.2		42
2500	43.3 ± 0.2		
3150	47.5 ± 0.1		
4000	51.3 ± 0.1		50
5000	55.4 ± 0.1		
6300	58.8 ± 0.2		
8000	65.5 ± 0.1		63
10000	71.3 ± 0.1		

Sound Transmission Class 39
Outdoor-Indoor Transmission Class 32

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

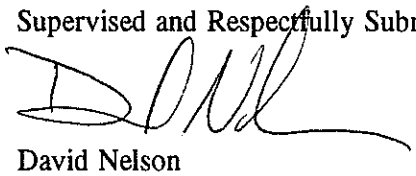
During the test the conditions in the receiving reverberation chamber were 18C and 75% relative humidity, and in the source chamber, 18C and 34% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By



Santos J. Salinas
Laboratory Technician [in Training]

Supervised and Respectfully Submitted,



David Nelson
Laboratory Technical Director

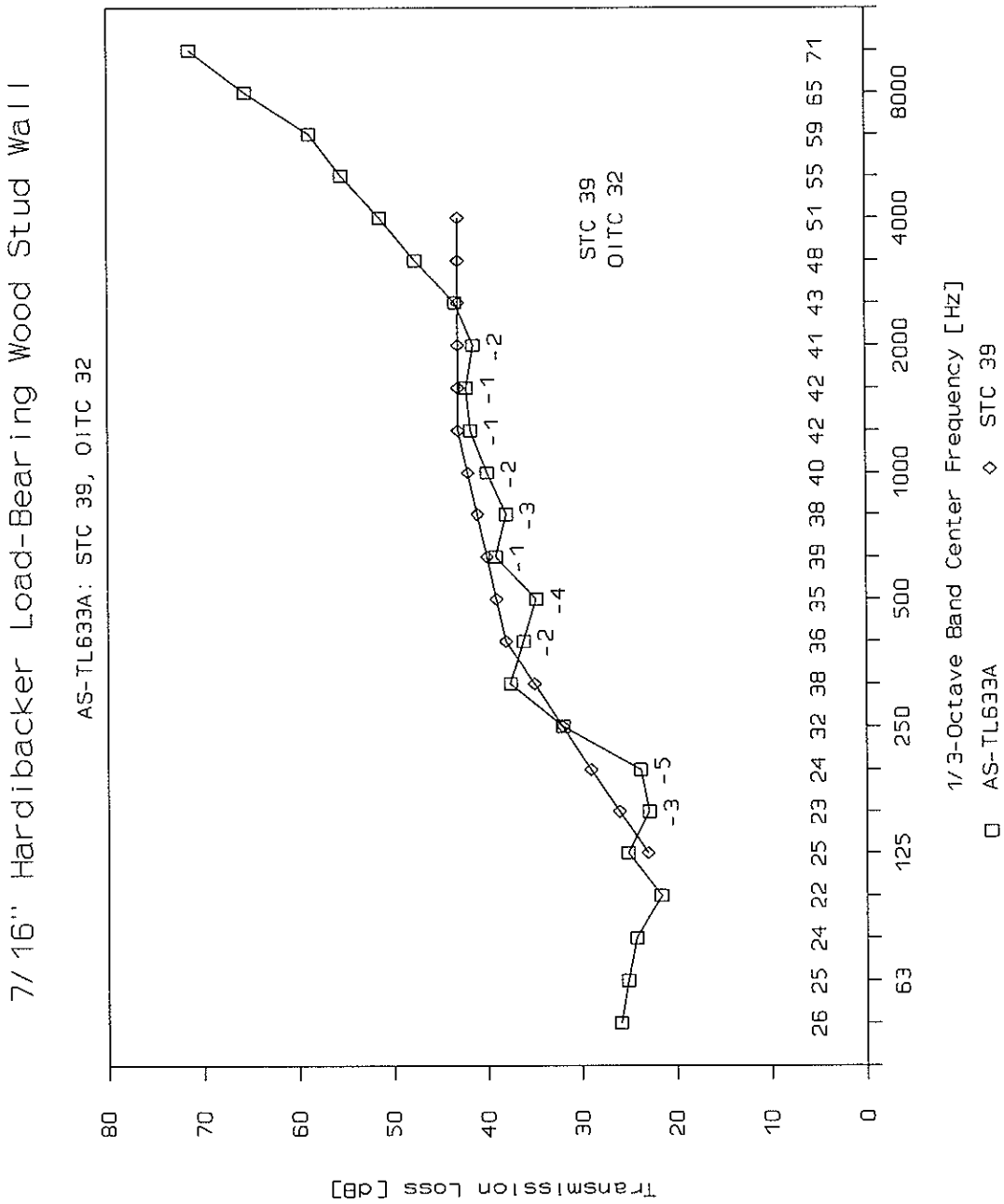

7/16" Hardibacker Load-Bearing Wood Stud Wall
AS-TL633A: STC 39, OITC 32
STC 39
OITC 32
Transmission Loss [dB]
1/3-Octave Band Center Frequency [Hz]
AS-TL633A
STC 39

Figure 1

ACOUSTIC SYSTEMS

ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
TL364A

ORIGINAL

Subject: Transmission Loss Test

Date: 15 March, 1990

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

Hardiplank/Wood Stud/No Cavity Insulation/
1/2 inch GWB

for

James Hardie Building Products, Inc.

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National Bureau of Standards

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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

ASTM E 90 - 85, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"

ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 87, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was examined and found to conform in all observable particulars to the following description provided by the manufacturer:

"The nominally 8 foot by 8 foot by 4-7/8 inch thick wall assembly consists of 2x4 wood framing members spaced 16 inches on center with 2x4 wood framing members as top and bottom plates. The top and bottom plates are fastened to the framing members with 2@ 16d common nails. Exterior cladding consists of 5/6 inch thick by 7-1/2 inch wide by 8 foot long HardiPlanks installed horizontally with 1-1/4 inch headlaps. Fastening consists of 6d corrosion-resistant common nails through the headlaps into perimeter and intermediate framing members. Interior sheathing consists of a single layer of 1/2 inch thick regular gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and at each intermediate framing member 12 inch on center with 1-1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws. Sheathing joints are sealed with gypsum wallboard joint compound and paper joint tape with screw heads receiving only joint compound."

The weight of the test specimen was 388 pounds, 6.1 pounds per square foot.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening. The perimeter channels of the panels were packed with fiberglass and the joiners were caulked.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C423-84. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 13-Mar-90 .

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

TL364A James Hardie Building Products, Inc.

Hardiplank/Wood Stud/No Cavity Insulation/1/2 inch GWB

Frequency	TL [dB]	notes	octave	def'cy
50	17.8 ± 1.2			
63	18.1 ± 1.1		19	
80	20.1 ± 0.9			
100	15.4 ± 1.2			
125	14.6 ± 0.7		15	5
160	16.1 ± 0.8			7
200	21.4 ± 0.7			5
250	26.0 ± 0.7		25	3
315	31.2 ± 0.4			1
400	33.6 ± 0.7			1
500	31.5 ± 0.5		33	4
630	36.6 ± 0.6			
800	40.9 ± 0.5			
1000	45.3 ± 0.5		44	
1250	49.2 ± 0.6			
1600	49.9 ± 0.3			
2000	50.6 ± 0.5		50	
2500	49.7 ± 0.5			
3150	43.5 ± 0.4			
4000	41.5 ± 0.4		43	
5000	46.3 ± 0.4			
6300	48.7 ± 0.4			
8000	54.1 ± 0.3		43	
10000	38.4 ± 0.5			

Sound Transmission Class 36

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 23C and 84% relative humidity, and in the source chamber, 23C and 84% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

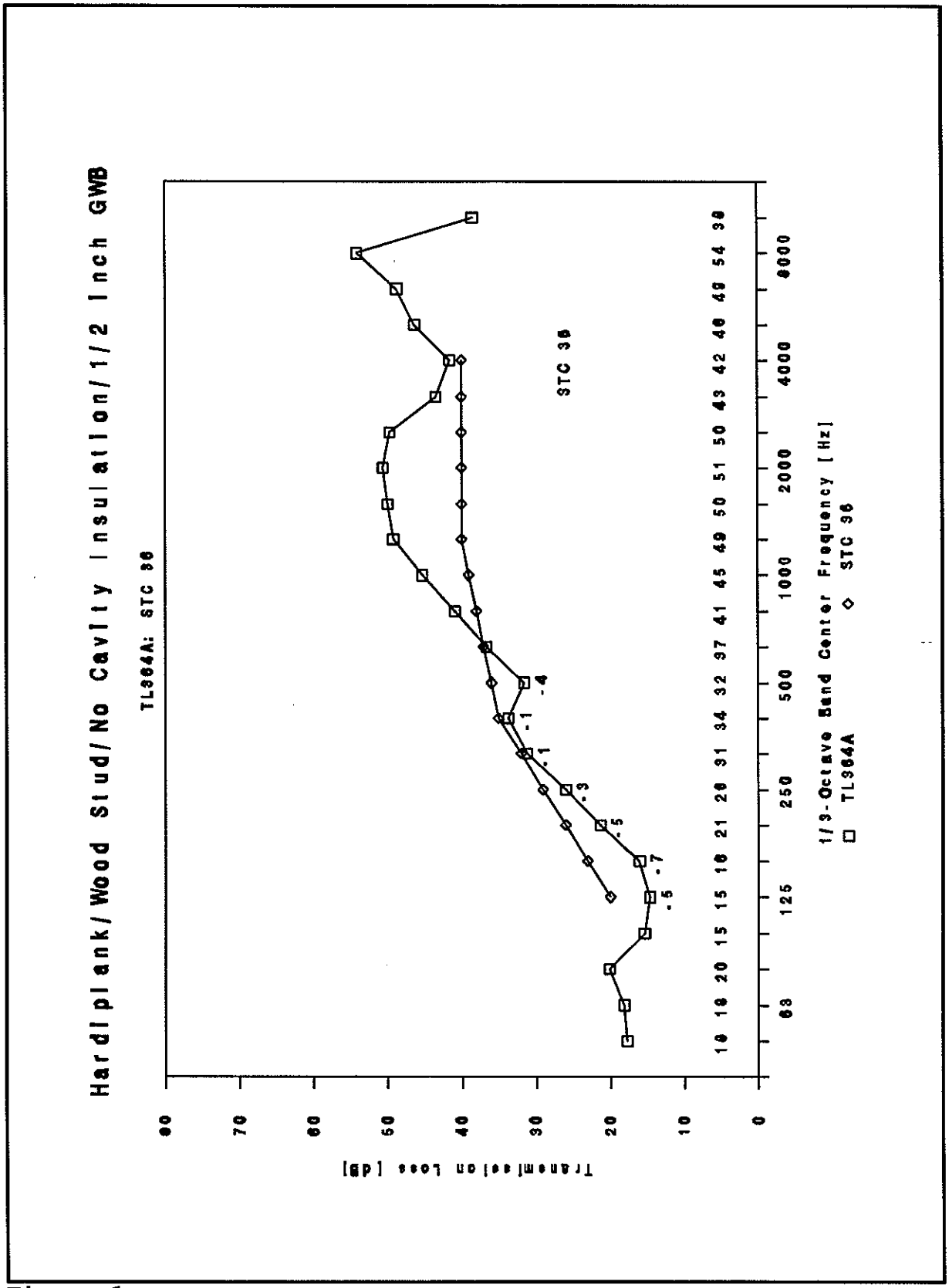
Hardplank/Wood Stud/No Cavity Insulation/1/2 Inch GWB
TL364A: STC 36
STC 36
Transmission Loss [dB]
1/3-Octave Band Center Frequency [Hz]
TL364A
STC 36
.1
.1
.1
.3
.4
.5
.5
.7

Figure 1

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
AS-TL364A-Addendum

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL364A was performed on 13 March 1990 for James Hardie Building Products of Fontana, California. The specimen under test was a Wood Stud Partition Wall and consisted of 2x4 wood framing members with 1/2-inch gypsum wallboard on the interior face and 5/16-inch HardiPlanks on the exterior face. The official specimen description is contained in test report AS-TL364A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL364A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL364A is 25. The Sound Transmission Class was 36.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
TL365A

ORIGINAL

Subject: Transmission Loss Test

Date: 15 March, 1990

Contents: Transmission Loss Data, 1/3-octave bands
Transmission Loss Data, octave bands
Sound Transmission Class Rating

on

Hardiplank/Wood Stud/Cavity Insulation/1/2 inch GWB

for

James Hardie Building Products, Inc.

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INTRODUCTION

"The 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." [ASTM E 90 - 85]

APPLICABLE STANDARDS

ASTM E 90 - 85, "Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"

ASTM C 423 - 84, "Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"

ASTM E 413 - 87, "Standard Classification for Determination of Sound Transmission Class"

SPECIMEN DESCRIPTION

The test specimen was examined and found to conform in all observable particulars to the following description provided by the manufacturer:

"The nominally 8 foot by 8 foot by 4-7/8 inch thick wall assembly consists of 2x4 wood framing members spaced 16 inch on center with 2x4 wood framing members as top and bottom plates. The top and bottom plates are fastened to the framing members with 2@ 16d common nails. Exterior cladding consists of 5/16 inch thick by 7-1/2 inch wide by 8 foot long Hardiplanks installed horizontally with 1-1/4 inch headlaps. Fastening consists of 6d corrosion-resistant common nails through the headlaps into the perimeter and intermediate framing members. Insulation batts (4 inch thick by 16 inch wide by 96 inch long R-11 fiberglass sound attenuation blankets - ASTM C665, Type I) are installed snugly into the stud cavities. Interior sheathing consists of a single layer of 1/2 inch thick regular gypsum wallboard (2 sheets nominally 4 foot by 8 foot) installed vertically and fastened at the perimeter and each intermediate framing member 12 inch on center with 1-1/4 inch long No. 8-18 self-drilling, gypsum wallboard screws. Sheathing joints are sealed with gypsum wallboard joint compound and paper joint tape with screw heads receiving only joint compound."

The weight of the test specimen was 401 pounds, 6.3 pounds per square foot.

TEST SPECIMEN MOUNTING

The specimen was mounted in the 8′ * 8′ transmission loss test opening. The perimeter channels of the panels were packed with fiberglass and the joiners were caulked.

DESCRIPTION OF TEST

Broad-band pink noise is produced by a loudspeaker in the source chamber. The steady-state space-time average sound pressure levels in the source and receive room were determined using rotating microphone booms and a Norwegian Instruments NI-830 Dual Channel Real Time Analyzer. The sound absorption in the receiving room was measured in accordance with ASTM C 423-84. The precision of the resulting calculated Transmission Loss varies with frequency band, and is included in the Data Table. The test was performed in strict accordance with ASTM E 90 - 87. This test took place at ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY, Austin, TX, on 13-Mar-90 .

TRANSMISSION LOSS DATA

The measured Sound Transmission Loss of the test specimen at the preferred one-third octave band center frequencies is tabulated below and presented graphically on page 5. The Octave-Band Transmission Loss values are calculated from the 1/3-Octave Band results assuming a "pink" source spectrum. This calculation is common practice, but is not part of E90.

TL365A James Hardie Building Products, Inc.

Hardiplank/Wood Stud/Cavity Insulation/1/2 inch GWB

Frequency	TL [dB]	notes	octave	def'cy
50	19.9 ± 0.5			
63	20.5 ± 0.7		21	
80	21.9 ± 0.6			
100	16.4 ± 0.9			
125	15.6 ± 0.3		17	8
160	19.8 ± 0.8			7
200	30.1 ± 0.8			
250	33.7 ± 0.3		33	
315	36.8 ± 0.3			
400	39.6 ± 0.5			
500	38.7 ± 0.2		40	1
630	42.1 ± 0.3			
800	46.4 ± 0.3			
1000	51.7 ± 0.1		50	
1250	54.9 ± 0.2			
1600	54.4 ± 0.1			
2000	55.3 ± 0.1		55	
2500	55.5 ± 0.1			
3150	49.8 ± 0.1			
4000	48.9 ± 0.1		50	
5000	52.9 ± 0.1			
6300	55.0 ± 0.2			
8000	61.9 ± 0.2		43	
10000	38.5 ± 0.2			

Sound Transmission Class 40

[a]: correction for flanking, [b]: corrections for background noise, [c]: insufficient precision, [d]: Transmission Loss of specimen too close to that of Filler Wall.

During the test the conditions in the receiving reverberation chamber were 21C and 88% relative humidity, and in the source chamber, 21C and 88% RH. The precision values tabulated above represent 95% probability that the true mean value lies within the stated range.

Test Performed By,

Monroe Talley

Respectfully Submitted,

David Nelson
Laboratory Technical Director

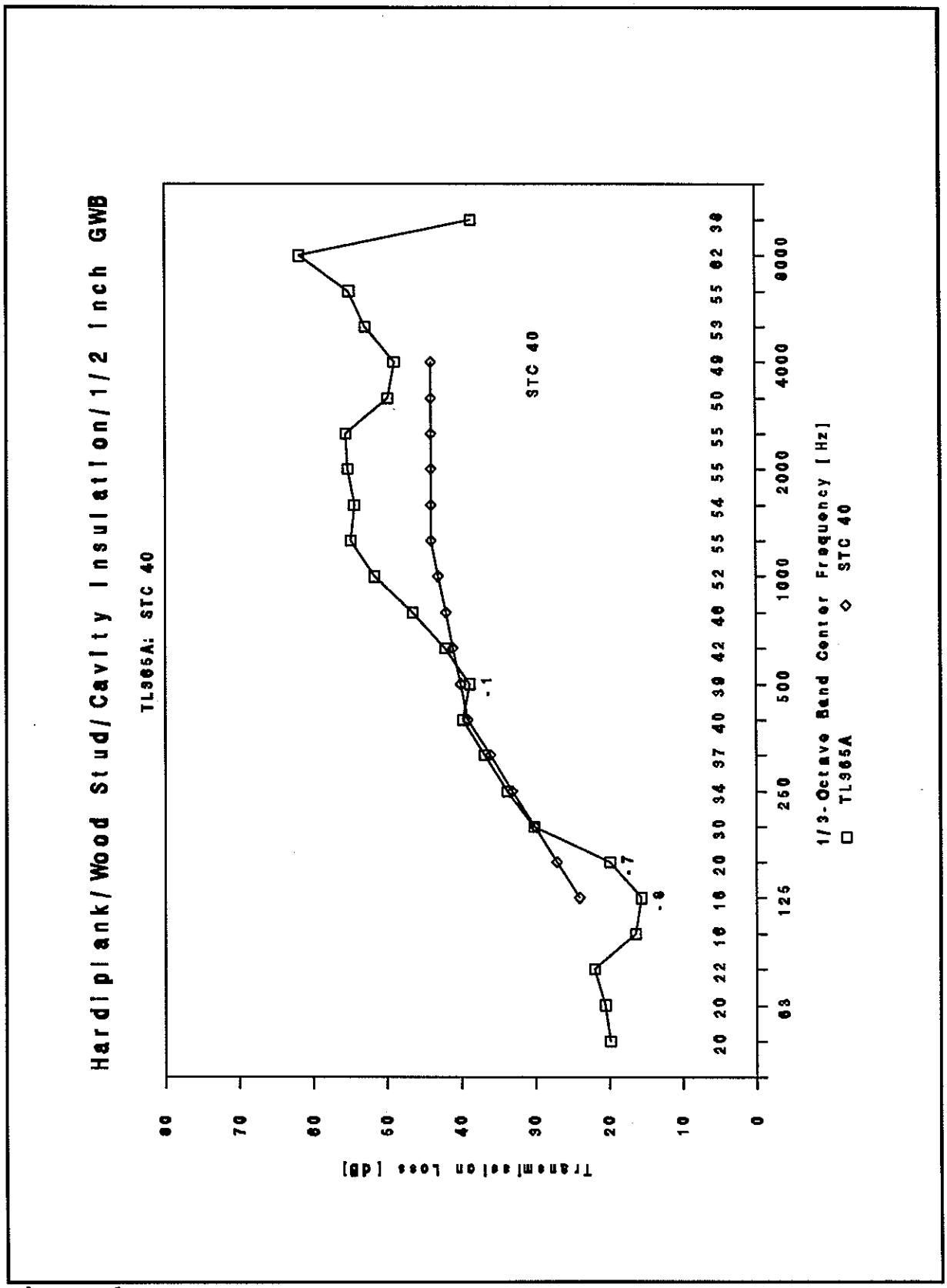
Hardiplank/Wood Stud/Cavity Insulation/1/2 Inch GWB
TL365A: STC 40
STC 40
Transmission Loss [dB]
1/3-Octave Band Center Frequency [Hz]
TL365A
STC 40

Figure 1

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
AS-TL365A-Addendum

ACOUSTIC SYSTEMS
ERNEST BUTLER, M.D., Chairman
JEFF G. SCHMITT, President

Subject: Outdoor-Indoor Transmission Class

Date: 16 September, 1992

Sound Transmission Loss test AS-TL365A was performed on 13 March 1990 for James Hardie Building Products of Fontana, California. The specimen under test was a Wood Stud Partition Wall and consisted of 2x4 wood framing members with 1/2-inch gypsum wallboard on the interior face, 4 inch thick R11 glass fiber batts as cavity insulation, and 5/16-inch HardiPlanks on the exterior face. The official specimen description is contained in test report AS-TL365A.

In the interim a new and more appropriate single number rating for exterior partitions has been created by ASTM: Outdoor-Indoor Transmission Class or OITC [ASTM E1332-90]. Whereas Sound Transmission Class [STC] tended to correlate well with reduction of speech-like [predominantly high freuqency] noises afforded by partitions, OITC is optimized to properly rank order partitions for their ability to isolate from low frequency noises associated with aircraft, automobile traffic and rail noise.

The OITC is calculated directly from the Transmission Loss values between 80 and 4000 Hz, inclusive. No re-test of the partition was conducted: the values used were those in AS-TL365A. OITC ratings are typically numerically lower than STC ratings. This is a consequence of the fact that for a given assembly the Transmission Loss is usually much greater at high frequency than at low frequency.

The Outdoor-Indoor Transmission Class of the "1-Hour Fire-Rated Exterior Wall Assembly" described in AS-TL365A is 28. The Sound Transmission Class was 40.

Sincerely,

David Nelson, Mem. INCE
Laboratory Technical Director

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