

**ASTM E 90 SOUND TRANSMISSION LOSS
TEST REPORT**

Rendered to:

THERMA-TRU CORPORATION

SERIES/MODEL: Classic-Craft, Fiber-Classic and Smooth-Star

TYPE: 3/8 Impact Rated 3/4 Lite Side Hinged Door

Summary of Test Results				
ATI Data File No.	Leaf Description	STC	OITC	EWNR
74723.01A*	Fiberglass skins and expanded foam core with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) glass temperature 73°F, inoperable test	28	26	31
74723.01B	Fiberglass skins and expanded foam core with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) glass temperature 73°F, operable test	27	25	29

** This test was not performed in accordance with ASTM E90, the door system was not operable. The door leaf was sealed on both sides with duct tape.*

Reference should be made to Architectural Testing, Inc. Report No. 74723.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

THERMA-TRU DOORS
118 Industrial Drive
Edgerton, Ohio 73517

Report No: 74723.01-113-11
Test Date: 10/11/07
Report Date: 12/03/07
Expiration Date: 10/11/11

Test Sample Identification:

Series/Model: Classic-Craft, Fiber-Classic and Smooth-Star

Type: 3/8 Impact Rated 3/4 Lite Side Hinged Door

Overall Size: 37-7/8" by 98"

Leaf Size: 36" by 95-1/4"

Leaf Description: Fiberglass Skins and Expanded Foam Core

Leaf Glazing: 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior)

Project Scope: Architectural Testing, Inc. was contracted by Therma-Tru Corporation to conduct sound transmission loss tests on a Series/Model Classic-Craft, Fiber-Classic and Smooth-Star, 3/8 impact rated 3/4 lite side hinged door. A summary of the results is listed in the Test Results section and the complete test data is included as Appendix B of this report. The sample was provided by the client.

Test Methods: The acoustical tests were conducted in accordance with the following:

ASTM E 90-04, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.**

ASTM E 413-04, *Classification for Rating Sound Insulation.*

Test Methods: (Continued)

ASTM E 1332-90 (Re-approved 2003), *Standard Classification for Determination of Outdoor-Indoor Transmission Class.*

ASTM E 2235-04, *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods.*

** For test number 74723.01A, the following deviation from the standard was performed: The door was tested in a sealed condition and was not operable during the test. The door leaf was sealed on both sides with duct tape.*

Test Equipment: The equipment used to conduct these tests meets the requirements of ASTM E 90. The microphones were calibrated before conducting sound transmission loss tests. The test equipment and test chamber descriptions are listed in Appendix A.

Sample Installation:

Sound transmission loss tests were initially performed on a filler wall that was designed to test 96" by 99" specimens. The filler wall achieved an STC rating of 69.

A filler wall reducing element was used to reduce the test opening size to 38-1/2" wide by 98-1/2" high. The reducing element consisted of a double 2x4 wood stud wall construction with three layers of 5/8" drywall on both sides. The stud cavities in the wall were insulated with two layers of R-13 fiberglass insulation. The door system was placed on a foam isolation pad in the new test opening. Duct seal was used to seal the perimeter of the test specimen to the test opening on both sides. The interior side of the door frame, when installed, was approximately 1/4" from being flush with the receiving room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing. For the operable test the door panel was opened and closed at least five times prior to testing.

Test Procedure: The door was closed and latched for this test. The sound transmission loss test consisted of the following measurements: One background noise sound pressure level and five sound absorption measurements were conducted at each of the five microphone positions. Two sound pressure level measurements were made simultaneously in both rooms, at each of the five microphone positions. The air temperature and relative humidity conditions were monitored and recorded during the background, absorption, source, and receive room measurements.

Sample Descriptions:

Door Construction:

	Main Frame	Leaf
Size	37-7/8" by 98"	36" by 95-1/4"
Thickness	4-1/2"	1-3/4"
Corners	Coped	Butted
Fasteners	Screws	Glue
Seal Method	Sealant	None
Material	Wood	See below
Reinforcement	N/A	N/A
Thermal Break Material	N/A	N/A
Daylight Opening Size	N/A	20-7/8" by 62-7/8"

Leaf Materials:

Layers (outside to inside)	Layer Description (material and thickness)
1	0.085" fiberglass skin
2	1.580" expanded foam
3	0.085" fiberglass skin

Comments: The lock stile was constructed from 3-5/8" by 1-1/2" plywood. The hinge stile was constructed from 7/8" by 1/2" wood. The top rail contained a composite member measuring 1" by 1-1/2". The bottom rail contained a composite member measuring 7/8" by 1-1/2". The door knob and deadbolt holes were reinforced by the lock stile. The hinge stile and lock stile were capped with 5/16" by 1-5/16" wood.

Sample Descriptions: (Continued)

Glazing:

Measured Overall Insulation Glass Unit Thickness	1.003"
Spacer Type	Aluminum butyl composite

	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.123", 0.090", 0.155"	0.512"	0.123"
Muntin Pattern	N/A	N/A	N/A
Material	Laminated	Air*	Tempered
Laminate Material	PVB	N/A	N/A

Glazing Method	Exterior pressure glazed
Glazing Material	Cellular glazing tape
Glazing Bead Material	Aluminum

* Stated per client/manufacturer, N/A-non applicable

Sample Descriptions: (Continued)

Components:

	TYPE	QUANTITY	LOCATION
Weatherstrip			
	Foam filled leaf gasket	1 Row	Head and jambs
	Triple leaf flexible door sweep with 1/2" bulb gasket	1	Leaf bottom rail
Hardware			
	Full mortise butt hinge	4	Hinge jamb / Hinge stile
	Dead bolt assembly	1	Lock stile
	Adjustable threshold	1	Sill
	Door knob	1	Lock stile
	Strike plate	2	Lock jamb
Drainage			
	Sloped sill	N/A	N/A

Comments: The weight of the door leaf was 112 lbs. The client did not supply drawings for the Series/Model Classic-Craft, Fiber-Classic and Smooth-Star, 3/8 impact rated 3/4 lite side hinged door. The door was disassembled, and the components will be retained by Architectural Testing, Inc. for four years. Photographs of the test specimen are included in Appendix C.

Test Results: The STC (Sound Transmission Class) and EWNR (Exterior Wall Noise Reduction) rating was calculated in accordance with ASTM E 413. The OITC (Outdoor-Indoor Transmission Class) was calculated in accordance with ASTM E 1332. A summary of the sound transmission loss test results on the Series/Model Classic-Craft, Fiber-Classic and Smooth-Star, 3/8 impact rated 3/4 lite side hinged door is listed below.

Summary of Test Results				
ATI Data File No.	Leaf Description	STC	OITC	EWNR
74723.01A*	Fiberglass skins and expanded foam core with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) glass temperature 73°F, inoperable test	28	26	31
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** This test was not performed in accordance with ASTM E90, the door system was not operable. The door leaf was sealed on both sides with duct tape.*

The complete test results are listed in Appendix B. Flanking limit tests and reference specimen tests are available upon request.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire. Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:


Brandon C. Ward
Technician - Acoustical Testing

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

BCW:alb

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (6)
- Appendix-C: Photographs (1)

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Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	12/03/07	N/A	Original Report Issue

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number
Analyzer	Agilent Technologies	35670A	Dynamic signal analyzer	Y002929
Receive Room Microphone	G.R.A.S.	40AR	1/2", pressure type, condenser microphone	Y003246
Source Room Microphone	G.R.A.S.	40AR	1/2", pressure type, condenser microphone	Y003245
Receive Room Preamp	G.R.A.S.	26AK	1/2" preamplifier	Y003249
Source Room Preamp	G.R.A.S.	26AK	1/2" preamplifier	Y003248
Microphone Calibrator	Bruel & Kjaer	4228	Pistonphone calibrator	Y002816
Noise Source	Delta Electronics	SNG-1	Two, non-coherelated "Pink" noise signals	Y002181
Equalizer	Rane	RPE228	Programmable EQ	Y002180
Power Amplifiers	Renkus-Heinz	P2000	2 - Amplifiers	Y002179 Y001779
Receive Room Loudspeakers	Renkus-Heinz	Trap Jr/9"	2 - Loudspeakers	Y001784 Y001785
Source Room Loudspeakers	Renkus-Heinz	Trap Jr/9"	2 - Loudspeakers	Y002649 Y002650

Test Chamber:

	Volume	Description
Receiving Room	8291.3 ft ³ (234 m ³)	Rotating vane and stationary diffusers. Temperature and humidity controlled. Isolation pads under the floor.
Source Room	7296.3 ft ³ (206.6 m ³)	Stationary diffusers only. Temperature and humidity controlled.

	Maximum Size	Description
TL Test Opening	14 ft wide by 10 ft high	Vibration break between source and receive rooms.

Appendix B
Complete Test Results



SOUND TRANSMISSION LOSS and EXTERIOR WALL NOISE REDUCTION

ASTM E90

Architectural Testing

ATI No.	74723.01A	Date	10/11/07
Client	Therma-Tru Corporation		
Specimen	Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, inoperable test		
Specimen Area	23.81 Sq Ft		
Filler Area	116.19 Sq Ft		
Operator	Brandon C. Ward		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	73.1	75.0	74.2	73.8	74.9	74.0
RH %	42.8	40.7	43.0	42.3	59.1	42.2

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	43.8	50.6	87.3	66.5	39.0	18	2.24	0	14.6
100	39.7	52.6	88.9	67.1	42.8	18	2.89	0	17.6
125	39.4	47.1	94.7	66.9	53.4	25	3.23	0	21.7
160	42.5	51.5	95.6	71.0	52.7	21	1.12	0	24.5
200	43.2	57.2	100.6	74.6	54.2	22	0.86	0	25.0
250	38.7	57.8	101.0	73.3	55.9	24	0.79	0	25.1
315	36.3	61.5	99.6	69.3	57.3	26	1.25	0	24.1
400	34.4	60.9	99.3	67.7	63.3	28	0.73	0	29.0
500	32.8	59.9	101.0	67.4	66.3	30	0.70	0	29.9
630	27.8	57.9	103.9	69.6	69.0	30	0.41	0	31.6
800	27.9	62.5	103.5	68.4	72.9	31	0.55	0	35.1
1000	27.6	64.0	102.8	66.7	76.7	32	0.42	0	38.0
1250	26.6	70.5	106.2	75.1	78.4	26	0.25	6	45.1
1600	22.2	74.3	112.4	83.2	77.2	24	0.16	8	46.1
2000	15.8	78.6	108.1	78.1	75.7	25	0.30	7	43.9
2500	7.5	92.4	106.8	64.2	77.7	37	0.18	0	34.2
3150	7.4	110.4	107.7	57.7	87.1	43	0.42	0	36.9
4000	6.6	133.9	106.2	57.1	90.7	42	0.31	0	42.2
5000	7.1	177.1	104.4	50.9	90.8	45	0.43	0	39.2

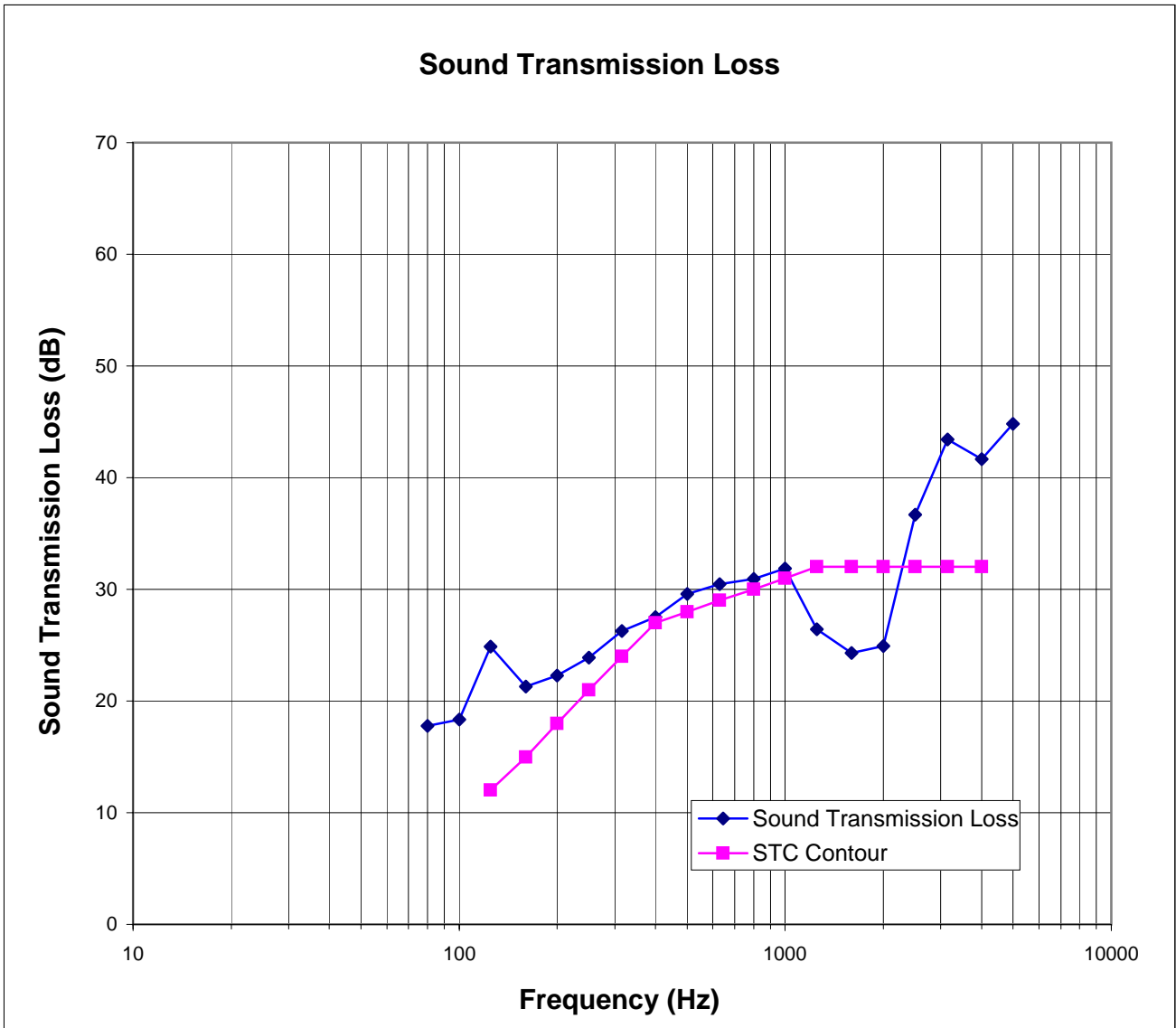
STC Rating =	28	<i>(Sound Transmission Class)</i>
Deficiencies =	21	<i>(Number of deficiencies versus contour curve)</i>
OITC Rating =	26	<i>(Outdoor/Indoor Transmission Class)</i>
EWNR Rating=	31	<i>(Exterior Wall Noise Reduction)</i>

Note: The acoustical chambers are qualified for measurements down to 80 hertz.
Data reported below 80 hertz is for reference only.



Architectural Testing

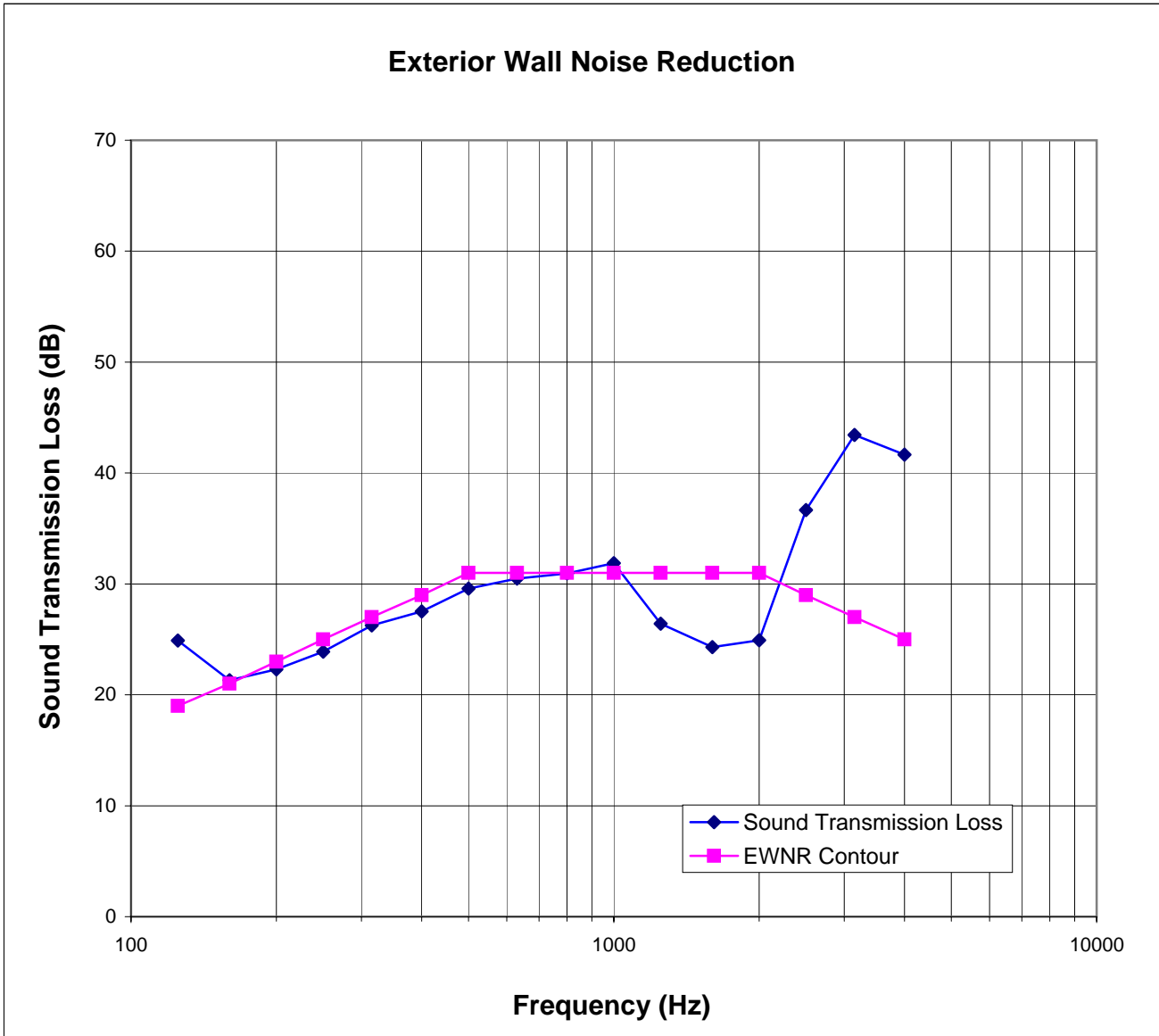
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Specimen Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, inoperable test
Specimen Area 23.81 Sq Ft
Filler Area 116.19 Sq Ft
Operator Brandon C. Ward





Architectural Testing

ATI No. 74723.01A Date 10/11/07
Client Therma-Tru Corporation
Specimen Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, inoperable test
Specimen Area 23.81 Sq Ft
Filler Area 116.19 Sq Ft
Operator Brandon C. Ward





SOUND TRANSMISSION LOSS and EXTERIOR WALL NOISE REDUCTION

ASTM E90

Architectural Testing


ATI No.	74723.01B	Date	10/11/07
Client	Therma-Tru Corporation		
Specimen	Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, operable test		
Specimen Area	23.81 Sq Ft		
Filler Area	116.19 Sq Ft		
Operator	Brandon C. Ward		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	74.7	75.5	77.0	75.5	74.9	75.6
RH %	37.6	37.3	36.8	37.3	59.1	37.2

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	40.6	52.4	87.6	66.3	39.0	18	2.30	0	14.2
100	38.5	55.8	89.2	68.3	42.8	17	3.00	0	18.7
125	37.0	51.1	94.8	67.8	53.4	24	3.47	0	22.8
160	42.1	55.9	95.7	72.5	52.7	20	1.17	0	26.3
200	42.0	56.2	100.6	76.1	54.2	21	1.05	0	26.5
250	36.5	55.2	101.0	75.0	55.9	22	0.70	0	26.7
315	35.4	59.1	99.7	71.0	57.3	25	1.08	0	25.6
400	34.4	61.4	99.2	69.6	63.3	26	0.68	0	30.9
500	32.8	63.3	101.0	69.9	66.3	27	0.64	0	32.6
630	26.8	60.2	103.8	72.1	69.0	28	0.46	0	34.5
800	27.3	63.7	103.5	72.1	72.9	27	0.52	2	38.8
1000	26.5	67.3	102.9	70.9	76.7	28	0.46	2	42.3
1250	25.6	72.6	106.2	76.3	78.4	25	0.30	6	46.5
1600	21.5	76.7	112.4	84.0	77.2	23	0.19	8	47.0
2000	18.6	82.1	108.1	78.7	75.7	24	0.42	7	44.8
2500	15.4	93.5	106.8	69.0	77.7	32	0.26	0	39.1
3150	13.4	111.0	107.6	66.7	87.1	34	0.24	0	46.1
4000	12.0	137.0	106.1	64.6	90.7	34	0.39	0	49.9
5000	10.8	184.9	104.4	60.5	90.8	35	0.33	0	49.0

STC Rating =	27	<i>(Sound Transmission Class)</i>
Deficiencies =	25	<i>(Number of deficiencies versus contour curve)</i>
OITC Rating =	25	<i>(Outdoor/Indoor Transmission Class)</i>
EWNR Rating=	29	<i>(Exterior Wall Noise Reduction)</i>

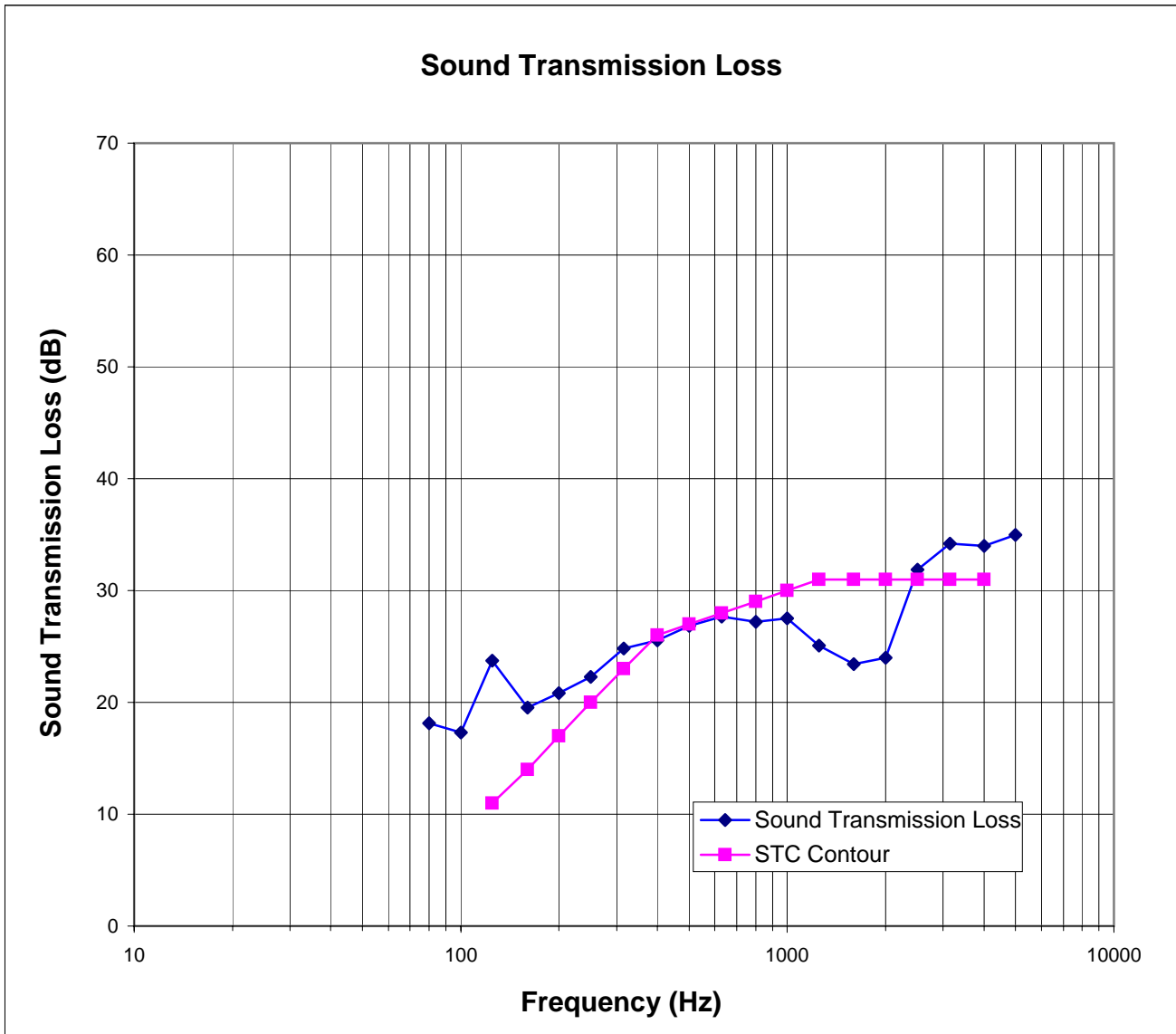
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Architectural Testing

ATI No. 74723.01B **Date** 10/11/07
Client Therma-Tru Corporation
Specimen Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, operable test
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Operator Brandon C. Ward

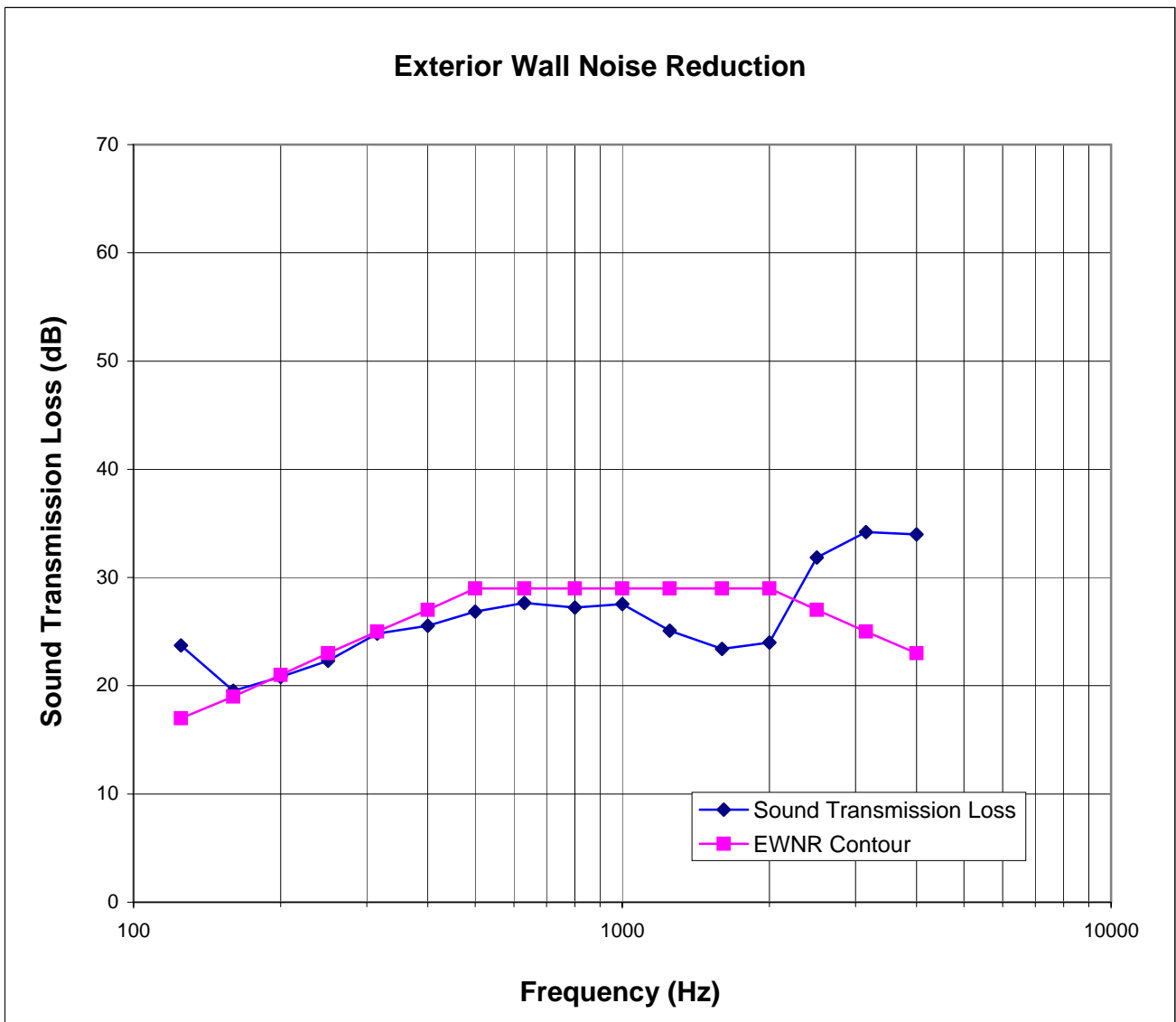


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Architectural Testing

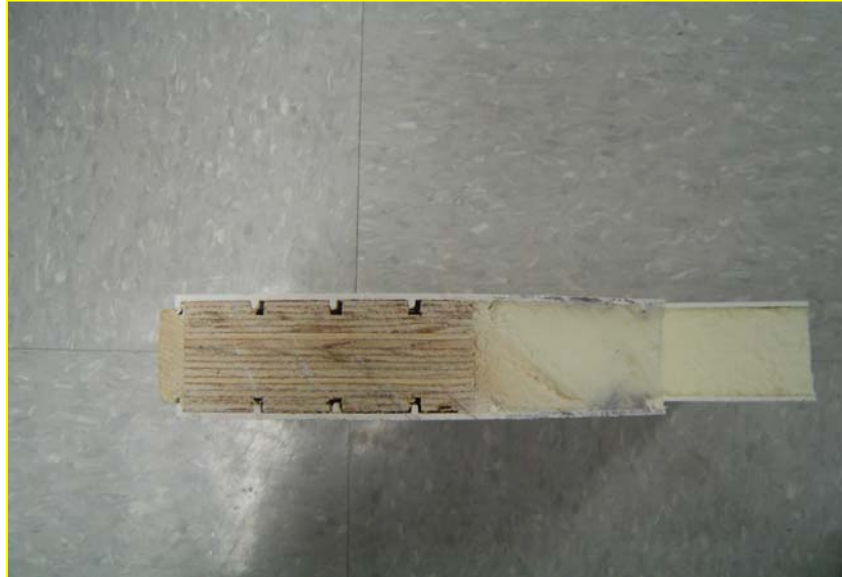
ATI No. 74723.01B **Date** 10/11/07
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Specimen Classic-Craft, Fiber-Classic and Smooth-Star Side Hinged, 3/4 Lite Impact Rated Door with 1" IG (3/8" laminated exterior, 1/2" air space, 1/8" tempered interior) temperature 73°F, operable test
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Appendix C

Photographs



Leaf Cross Section at Lock Stile