

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

**Rendered to:**

**THERMA-TRU DOORS**

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

**TYPE: 3/6-8 Impact Rated Full Lite Side Hinged Door**

<b>Summary of Test Results</b>				
<b>ATI Data File No.</b>	<b>Leaf Description</b>	<b>STC</b>	<b>OITC</b>	<b>EWNR</b>
74366.01A*	Fiberglass skins and expanded foam core with 1" IG (1/8" tempered exterior, 1/2" air space, 3/8" laminated interior) Glass temperature - 75°F, inoperable test	26	28	30
74366.01B	Fiberglass skins and expanded foam core with 1" IG (1/8" tempered exterior, 1/2" air space, 3/8" laminated interior) Glass temperature - 75°F, operable test	25	26	29

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

Reference should be made to ATI Report No. 74366.01-113-11 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: 74366.01-113-11  
Test Date: 08/15/07  
Report Date: 12/05/07  
Expiration Date: 08/15/11

**Test Sample Identification:**

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

**Type:** 3/6-8 Impact Rated Full Lite Side Hinged Door

**Overall Size:** 37-7/8" by 82-1/8"

**Leaf Size:** 36" by 79-1/4"

**Leaf Description:** Fiberglass Skins and Expanded Foam Core

**Leaf Glazing:** 1" IG (1/8" Tempered Exterior, 1/2" Air Space, 3/8" Laminated Interior)

**Project Scope:** Architectural Testing, Inc. was contracted by Therma-Tru Doors to conduct sound transmission loss tests on a Series/Model Classic-Craft, Fiber-Classic, and Smooth-Star, 3/6-8 impact rated full 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*.

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 74366.01A, the following deviation from the standard was performed: The door was testing 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 40" by 86" and 80" by 86" test specimens. The filler wall achieved an STC rating of 64.

The 40" by 86" plug was removed from the filler wall assembly. The door system was placed on a foam isolation pad in the 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. 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:**

	<b>Main Frame</b>	<b>Leaf</b>
<b>Size</b>	37-7/8" by 82-1/8"	36" by 79-1/4"
<b>Thickness</b>	4-1/2"	1-3/4"
<b>Corners</b>	Coped	Butted
Fasteners	Screws	Glue
Seal Method	Sealant	None
<b>Material</b>	Wood	See below
Reinforcement	N/A	N/A
Thermal Break Material	N/A	N/A
<b>Daylight Opening Size</b>	N/A	20-7/8" by 63"

**Leaf Materials:**

<b>Layers (outside to inside)</b>	<b>Layer Description (material and thickness)</b>
1	0.085" Fiberglass skin
2	1.559" 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:**

<b>Measured Overall Insulation Glass Unit Thickness</b>	0.996"
<b>Spacer Type</b>	Aluminum butyl composite

	<b>Exterior Sheet</b>	<b>Gap</b>	<b>Interior Sheet</b>
<b>Measured Thickness</b>	0.123"	0.505"	0.123", 0.090", 0.155"
<b>Muntin Pattern</b>	N/A	N/A	N/A
<b>Material</b>	Tempered	Air*	Laminated
<b>Laminate Material</b>	N/A	N/A	PVB

<b>Glazing Method</b>	Interior pressure glazed
<b>Glazing Material</b>	Cellular glazing tape
<b>Glazing Bead Material</b>	Aluminum

**Components:**

	<b>TYPE</b>	<b>QUANTITY</b>	<b>LOCATION</b>
<b>Weatherstrip</b>			
	Foam filled leaf gasket	1 Row	Head and jambs
	Triple leaf flexible door sweep with 1/2" bulb gasket	1	Leaf bottom rail
<b>Hardware</b>			
	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
<b>Drainage</b>			
	Sloped sill	N/A	N/A

\* - Stated per Client/Manufacturer, N/A-Non Applicable

**Comments:** The weight of the door leaf was 94 lbs. The client did not supply drawings on the Series/Model Classic-Craft, Fiber-Classic, and Smooth-Star, 3/6-8 impact rated full lite side hinged door. The door was disassembled, and the components will be retained by ATI 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, 3/6-8 impact rated full lite side hinged door is listed below.

Summary of Test Results				
ATI Data File No.	Leaf Description	STC	OITC	EWNR
74366.01A*	Fiberglass skins and expanded foam core with 1" IG (1/8" tempered exterior, 1/2" air space, 3/8" laminated interior) Glass temperature - 75°F, inoperable test	26	28	30
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\* - This test was not performed in accordance with ASTM E90 because 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:

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Kurt A. Golden  
Senior Technician - Acoustical Testing


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Todd D. Kister  
Laboratory Supervisor - Acoustical Testing

KAG:crc

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)

 <p>NVLAP LAB CODE 200361</p>	<p>Architectural Testing, Inc is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program for the specific test methods listed under lab code 200361. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by NIST. This test report applies only to the specimen that was tested.</p>
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### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	12/05/07	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 <sup>3</sup> (234 m <sup>3</sup> )	Rotating vane and stationary diffusers. Temperature and humidity controlled. Isolation pads under the floor.
Source Room	7296.3 ft <sup>3</sup> (206.6 m <sup>3</sup> )	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

<b>ATI No.</b>	74366.01A	<b>Date</b>	08/15/07
<b>Client</b>	Therma-Tru Doors		
<b>Specimen</b>	Classic-Craft, Fiber-Classic and Smooth-Star, side hinged door with full light, impact glazing with 1" IG(1/8" tempered exterior, 1/2" air space, 3/8" laminated interior), inoperable test, sealed with duct tape, Glass temperature 75F		
<b>Specimen Area</b>	19.81 Sq Ft		
<b>Filler Area</b>	120.19 Sq Ft		
<b>Operator</b>	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
<b>Temp F</b>	76.4	77.5	74.8	76.6	73.8	76.3
<b>RH %</b>	44.0	41.7	42.9	43.1	62.0	42.9

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	39.8	51.6	85.4	57.4	31.9	25	1.55	0	0.2
100	39.1	57.1	87.2	59.9	35.8	24	3.54	0	5.2
125	40.5	51.2	93.6	58.2	43.1	33	2.92	0	4.0
160	44.1	52.5	95.1	64.6	46.3	26	0.94	0	12.3
200	46.2	51.7	99.5	70.5	51.3	25	1.00	0	18.6
250	41.6	58.9	100.8	68.5	51.5	27	1.33	0	16.2
315	38.8	60.1	98.9	66.4	56.6	28	0.60	0	21.0
400	35.4	64.2	98.5	65.4	60.0	28	0.66	0	24.2
500	33.8	60.9	99.8	66.4	59.0	29	0.71	0	22.7
630	27.1	58.2	102.1	67.8	63.1	30	0.71	0	25.7
800	26.0	61.8	102.1	65.3	65.0	32	0.67	0	25.3
1000	23.7	65.6	101.5	63.9	66.7	32	0.56	0	26.5
1250	23.7	71.3	105.4	70.1	73.8	30	0.47	0	36.3
1600	18.6	73.6	111.6	83.6	75.9	22	0.28	8	45.8
2000	13.2	78.8	107.1	73.8	75.7	27	0.46	3	40.5
2500	7.5	89.4	105.7	59.0	75.4	40	0.21	0	27.4
3150	7.1	106.7	106.8	54.5	76.9	45	0.28	0	24.1
4000	6.7	131.2	105.4	52.7	78.6	45	0.49	0	26.3
5000	7.0	170.4	103.7	47.4	80.5	47	0.55	0	25.8

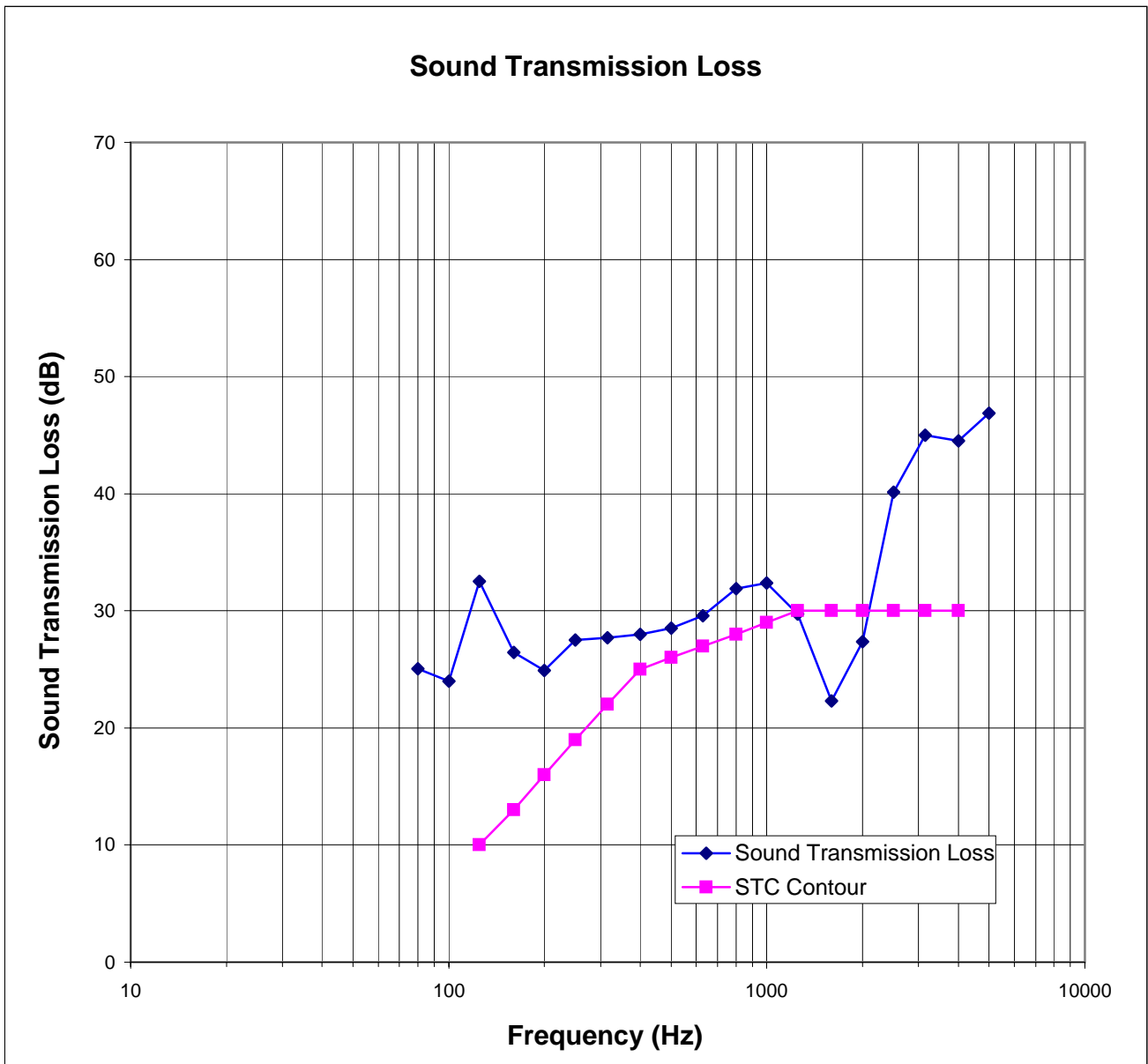
<b>STC Rating =</b>	<b>26</b>	<i>(Sound Transmission Class)</i>
<b>Deficiencies =</b>	<b>11</b>	<i>(Number of deficiencies versus contour curve)</i>
<b>OITC Rating =</b>	<b>28</b>	<i>(Outdoor/Indoor Transmission Class)</i>
<b>EWNR Rating=</b>	<b>30</b>	<i>(Exterior Wall Noise Reduction)</i>

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



### Architectural Testing

**ATI No.** 74366.01A **Date** 08/15/07  
**Client** Therma-Tru Doors  
**Specimen** Classic-Craft, Fiber-Classic and Smooth-Star, side hinged door with full light, impact glazing with 1" IG(1/8" tempered exterior, 1/2" air space, 3/8" laminated interior), inoperable test, sealed with duct tape, Glass temperature 75F  
**Specimen Area** 19.81 Sq Ft  
**Filler Area** 120.19 Sq Ft  
**Operator** Kurt A. Golden





### Architectural Testing

ATI No. 74366.01A

Date 08/15/07

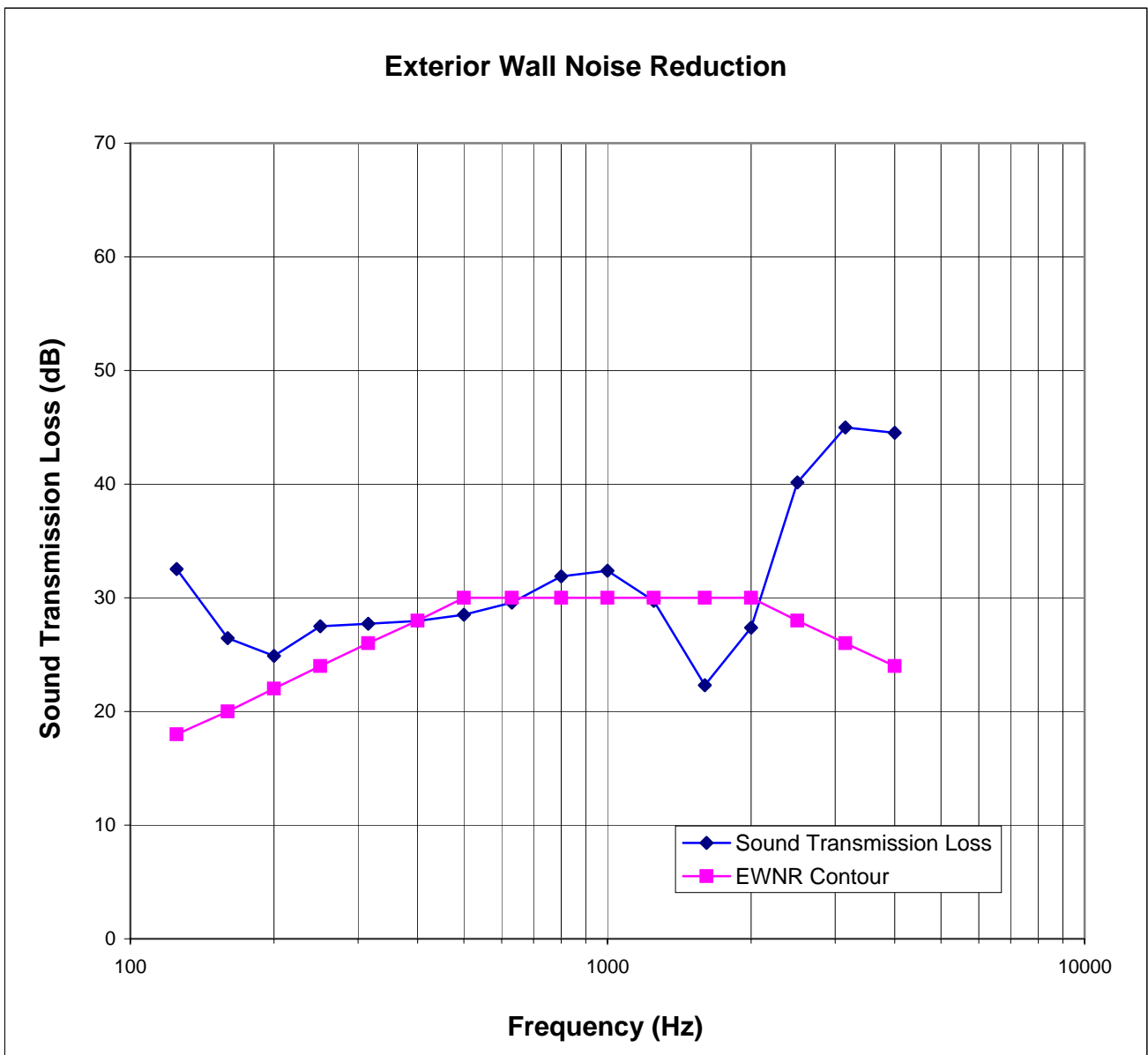
Client Therma-Tru Doors

Specimen Classic-Craft, Fiber-Classic and Smooth-Star, side hinged door with full light, impact glazing with 1" IG(1/8" tempered exterior, 1/2" air space, 3/8" laminated interior), inoperable test, sealed with duct tape, Glass temperature 75F

Specimen Area 19.81 Sq Ft

Filler Area 120.19 Sq Ft

Operator Kurt A. Golden





## SOUND TRANSMISSION LOSS and EXTERIOR WALL NOISE REDUCTION

ASTM E90

### Architectural Testing

<b>ATI No.</b>	74366.01B	<b>Date</b>	08/15/07
<b>Client</b>	Therma-Tru Doors		
<b>Specimen</b>	Classic-Craft, Fiber-Classic and Smooth-Star, side hinged door with full light, impact glazing with 1" IG(1/8" tempered exterior, 1/2" air space, 3/8" laminated interior), operable test, Glass temperature 75F		
<b>Specimen Area</b>	19.81 Sq Ft		
<b>Filler Area</b>	120.19 Sq Ft		
<b>Operator</b>	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
<b>Temp F</b>	78.0	78.3	77.3	78.0	73.8	77.9
<b>RH %</b>	43.0	42.7	41.6	43.0	62.0	42.6

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	41.1	53.4	85.5	56.8	31.9	26	1.79	0	-0.3
100	43.0	57.3	87.5	60.3	35.8	24	3.09	0	5.4
125	42.2	49.6	93.4	59.8	43.1	31	2.69	0	5.7
160	47.2	55.9	95.0	65.3	46.3	25	1.46	0	13.2
200	48.2	55.9	99.6	71.2	51.3	24	0.74	0	19.6
250	41.0	56.9	100.8	70.5	51.5	26	1.57	0	18.0
315	37.6	60.2	99.1	67.3	56.6	27	0.70	0	21.8
400	35.8	61.5	98.8	66.0	60.0	28	0.60	0	24.3
500	34.2	62.9	99.7	66.6	59.0	28	0.59	0	23.0
630	27.6	61.7	102.0	69.9	63.1	27	0.99	0	28.1
800	27.0	64.2	102.0	69.5	65.0	27	0.48	0	29.7
1000	24.9	67.7	101.8	68.6	66.7	28	0.61	0	31.0
1250	25.0	72.4	105.2	72.7	73.8	27	0.44	2	39.1
1600	21.1	75.2	111.5	84.3	75.9	21	0.21	8	46.7
2000	15.1	80.3	107.1	75.7	75.7	25	0.24	4	42.5
2500	9.9	90.8	106.0	68.5	75.4	31	0.47	0	36.6
3150	8.2	108.6	106.8	66.3	76.9	33	0.32	0	35.9
4000	7.3	132.8	105.5	63.4	78.6	34	0.37	0	36.9
5000	7.4	168.4	103.7	60.9	80.5	33	0.45	0	39.2

<b>STC Rating =</b>	<b>25</b>	<i>(Sound Transmission Class)</i>
<b>Deficiencies =</b>	<b>14</b>	<i>(Number of deficiencies versus contour curve)</i>
<b>OITC Rating =</b>	<b>26</b>	<i>(Outdoor/Indoor Transmission Class)</i>
<b>EWNR Rating=</b>	<b>29</b>	<i>(Exterior Wall Noise Reduction)</i>

**Note:** The acoustical chambers are qualified for measurements down to 80 hertz.  
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Date 08/15/07

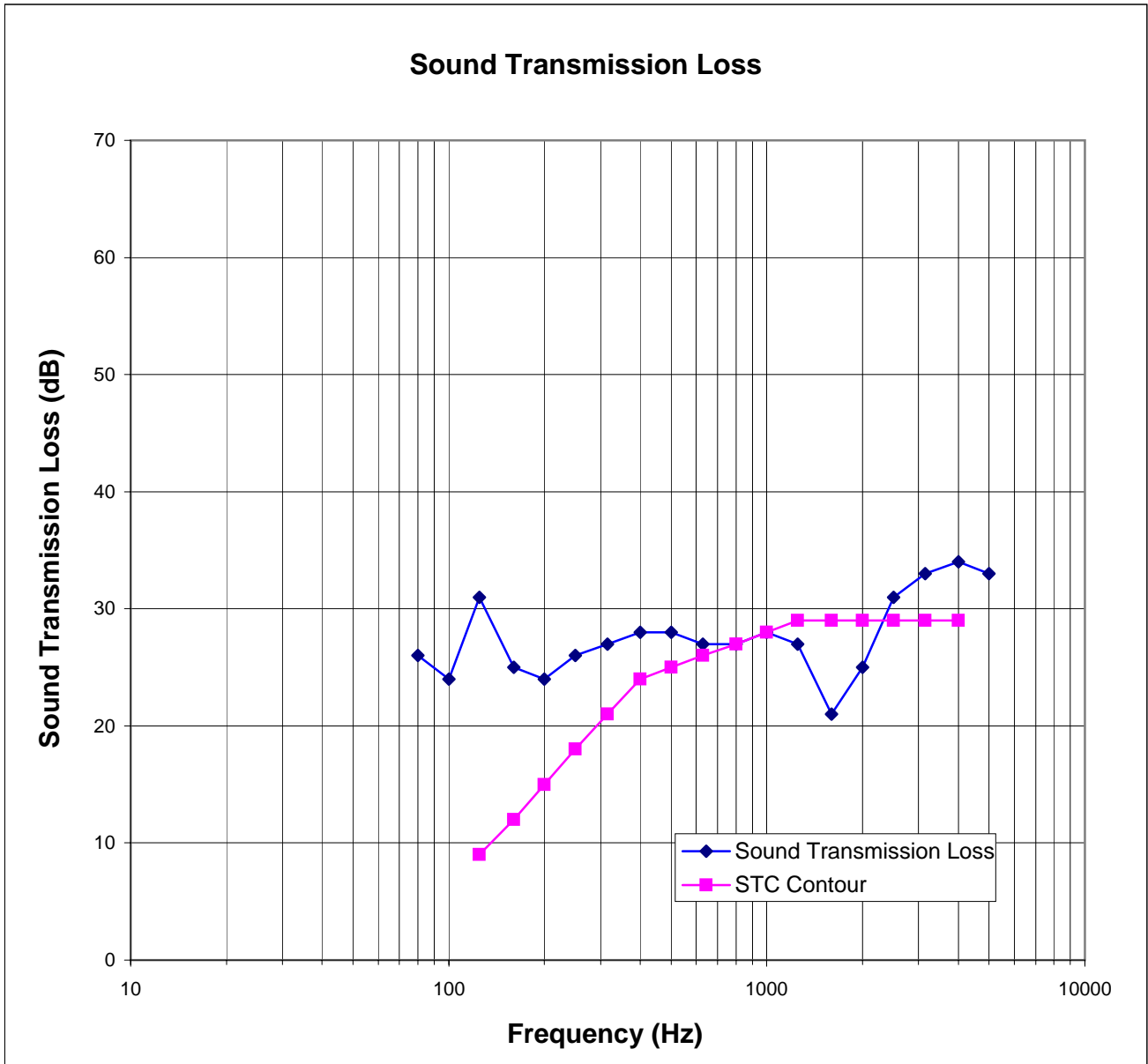
Client Therma-Tru Doors

Specimen Classic-Craft, Fiber-Classic and Smooth-Star, side hinged door with full light, impact glazing with 1" IG(1/8" tempered exterior, 1/2" air space, 3/8" laminated interior), operable test, Glass temperature 75F

Specimen Area 19.81 Sq Ft

Filler Area 120.19 Sq Ft

Operator Kurt A. Golden



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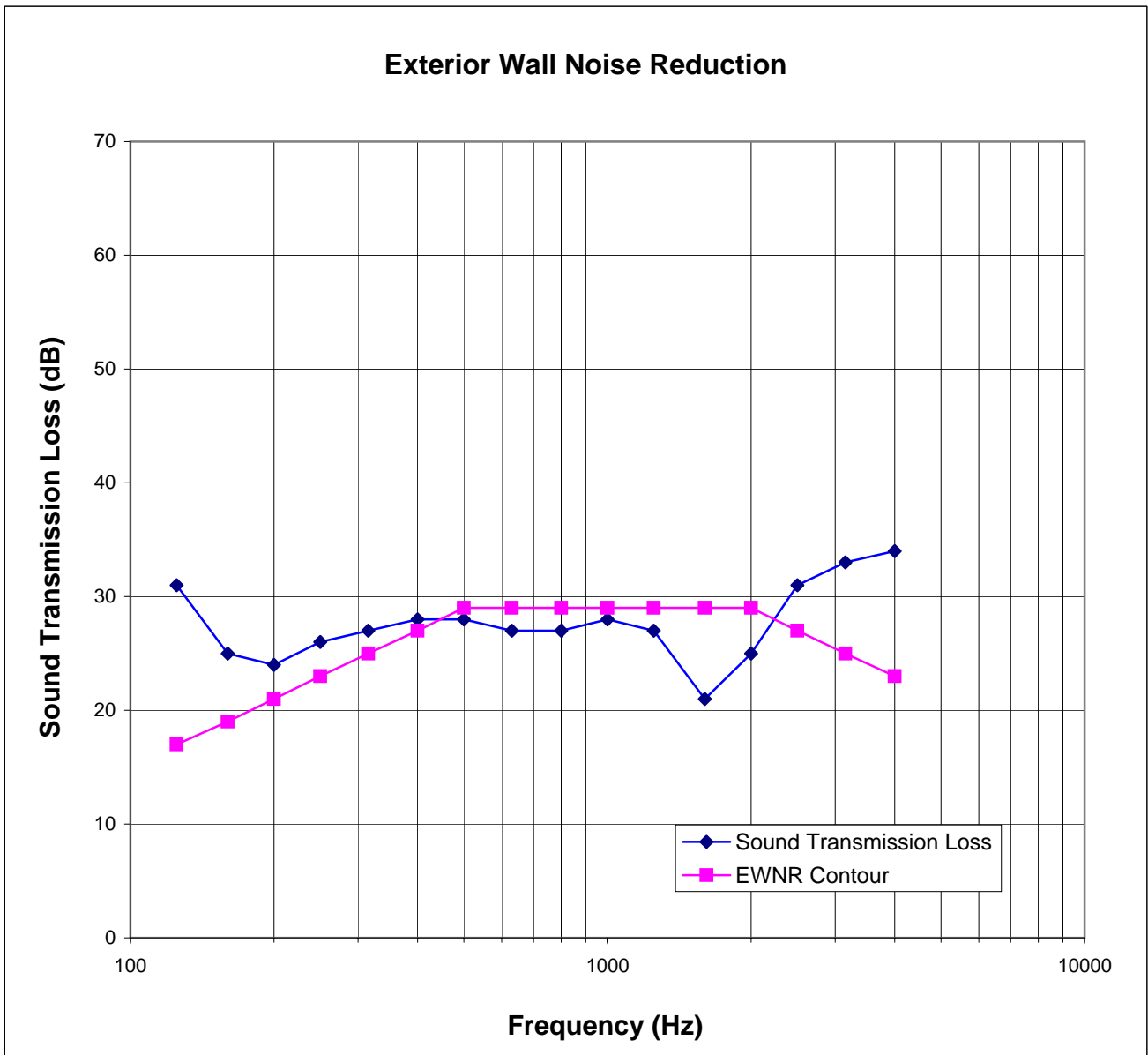
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**Appendix C**

**Photographs**



**Leaf Cross Section at Lock Stile**



**Source Room View of Installed Specimen**