

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

Rendered to:

TUBELITE, INC.

SERIES/MODEL: T24000

TYPE: Side-Hinged Single Thermal Door

Summary of Test Results			
Data File No.	Glazing (Nominal Dimensions)	STC	OITC
C5775.01	1-1/16" IG (1/4" heat strengthened exterior, 1/2" air space, 5/16" laminated interior), Glass temperature 75°F	33	30

Reference should be made to Architectural Testing, Inc. Report No. C5775.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

TUBELITE, INC.
4878 Mackinaw Trail
Reed City, Michigan 49677

Report No: C5775.01-113-11
Test Date: 03/25/13
Report Date: 05/01/13
Record Retention End Date: 05/01/17

Test Sample Identification:

Series/Model: T24000

Type: Side-Hinged Single Thermal Door

Overall Frame Size: 43" by 88"

Glazing (Nominal Dimensions): 1-1/16" IG (1/4" Heat Strengthened Exterior, 1/2" Air Space, 5/16" Laminated Interior), Glass Temperature 75°F

Project Scope: Architectural Testing, Inc. was contracted by Tubelite, Inc. to conduct sound transmission loss tests on a Series/Model T24000, side-hinged single thermal 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 90-09, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.*

ASTM E 413-10, *Classification for Rating Sound Insulation.*

ASTM E 1332-10a, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation.*

ASTM E 2235-04 (Reapproved 2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods.*

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 similar size specimens. The filler wall achieved an STC rating of 68.

The specimen plug was removed from the filler wall assembly. The side-hinged single thermal door was placed on an 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. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing. The operable panel was opened and closed at least five times prior to testing.

Test Procedure: The side-hinged single thermal door was closed and locked for this test. The sound transmission loss test was conducted in accordance with the ASTM E 90 test method using a single direction of measurement. 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:

Frame Construction:

		Frame
Size		43" by 88"
Thickness		4-1/2"
Corners		Butted
	Fasteners	Screws
	Seal Method	None
Material		Aluminum
	Reinforcement	N/A
	Thermal Break Material	Insulbar

N/A-Non Applicable

Sample Descriptions: (Continued)

Panel Construction:

	Panel
Size	39-3/4" by 85"
Thickness	1-3/4"
Corners	Butted
Fasteners	Screws
Seal Method	None
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	Insulbar
Daylight Opening Size	29-1/2" by 69"

Glazing:

Measured Overall Insulation Glass Unit Thickness	1.087"
Spacer Type	Aluminum

	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.221"	0.557"	0.125", 0.059", 0.125"
Muntin Pattern	N/A	N/A	N/A
Material	Heat strengthened	Air*	Laminated
Laminate Material	N/A	N/A	PVB

Glazing Method	Pressure
Glazing Material	Flexible wedge gasket
Glazing Bead Material	Aluminum

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

Sample Descriptions: (Continued)

Components:

TYPE	QUANTITY	LOCATION
Weatherstrip		
1/4" Diameter hollow bulb gasket	1 Row	Head and jambs
Sweep with 3/8" leaf	1 Row	Bottom rails
Hardware		
Hinge	3	Hinge jamb
Keyed lock bolt	1	Lock stile
Handle	1	Lock stiles
Drainage		
No drainage		

Comments: The total weight of the sample was 198 lbs. The design drawings (included in Appendix C) supplied by the client, accurately describe the Series/Model T24000, side-hinged single thermal door. The dimensions on the drawings that are circled and/or checked were verified against the test specimen. The side-hinged single thermal door was disassembled, and the components will be retained by Architectural Testing for four years. Photographs of the test specimen are included in Appendix D.

Test Results: The STC (Sound Transmission Class) 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 T24000, side-hinged single thermal door is listed below.

Summary of Test Results			
Data File No.	Glazing (Nominal Dimensions)	STC	OITC
C5775.01	1-1/16" IG (1/4" heat strengthened exterior, 1/2" air space, 5/16" laminated interior), Glass temperature 75°F	33	30

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

Architectural Testing will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing for the entire test record retention period.

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 tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC:



Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Senior Technician - Acoustical Testing



Digitally Signed by: Todd D. Kister

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

KAG:jmc

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

- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (2)
- Appendix-C: Design drawings (4)
- Appendix-D: Photographs (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	05/01/13	N/A	Original Report Issue

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Analyzer	Hewlett Packard	HP35670A	Real time analyzer	004112	07/11 *
Data Acquisition Unit	Agilent	34970A	Data Acquisition Unit	62211	07/12
Receive Room Microphone	GRAS	40 AR	1/2" Microphone	Y003246	08/12
Source Room Microphone	GRAS	40 AR	1/2" Microphone	Y003245	08/12
Receive Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	Y003249	08/12
Source Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	Y003248	08/12
Microphone Calibrator	Bruel & Kjaer	Type 4228	Pistonphone Calibrator	Y002816	02/13
Noise Source	Delta Electronics	SNG-1	Noise Generator	Y002181	N/A
Equalizer	Rane	RPE 228	Programmable Equalizer	Y002180	N/A
Power Amplifiers	Crown	Xti 2000	Two, Amplifiers	005769 005770	N/A
Receive Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y001784 Y001785	N/A
Source Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y002649 Y002650	N/A
Receive Room Environmental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	005066	09/12
Source Room Environmental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	Y002652	10/12
Weather Station	Davis Instruments	VantagePRO 6150C	Weather Station	Y003257	05/12

*- Note: The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chamber:

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

	Maximum Size	Description
TL Test Opening	4.27 m (14 ft) wide by 3.05 m (10 ft) high	Vibration break between source and receive rooms

N/A-Non Applicable

Appendix B
Complete Test Results

SOUND TRANSMISSION LOSS
ASTM E 90

Test Date	03/25/13		
ATI No.	C5775.01		
Client	Tubelite, Inc.		
Specimen	Series/Model: T24000, side-hinged single door system with full lite 1-1/16" IG (1/4" heat strengthened exterior, 1/2" air space, 5/16" laminated interior), Glass temperature 75°F		
Operator	Kurt Golden		
Sample Area	2.50 m ²		
Filler Area	10.50 m ²		
	Source	Receive	Specimen
Temp C	22	20	21
RH %	48	52	49

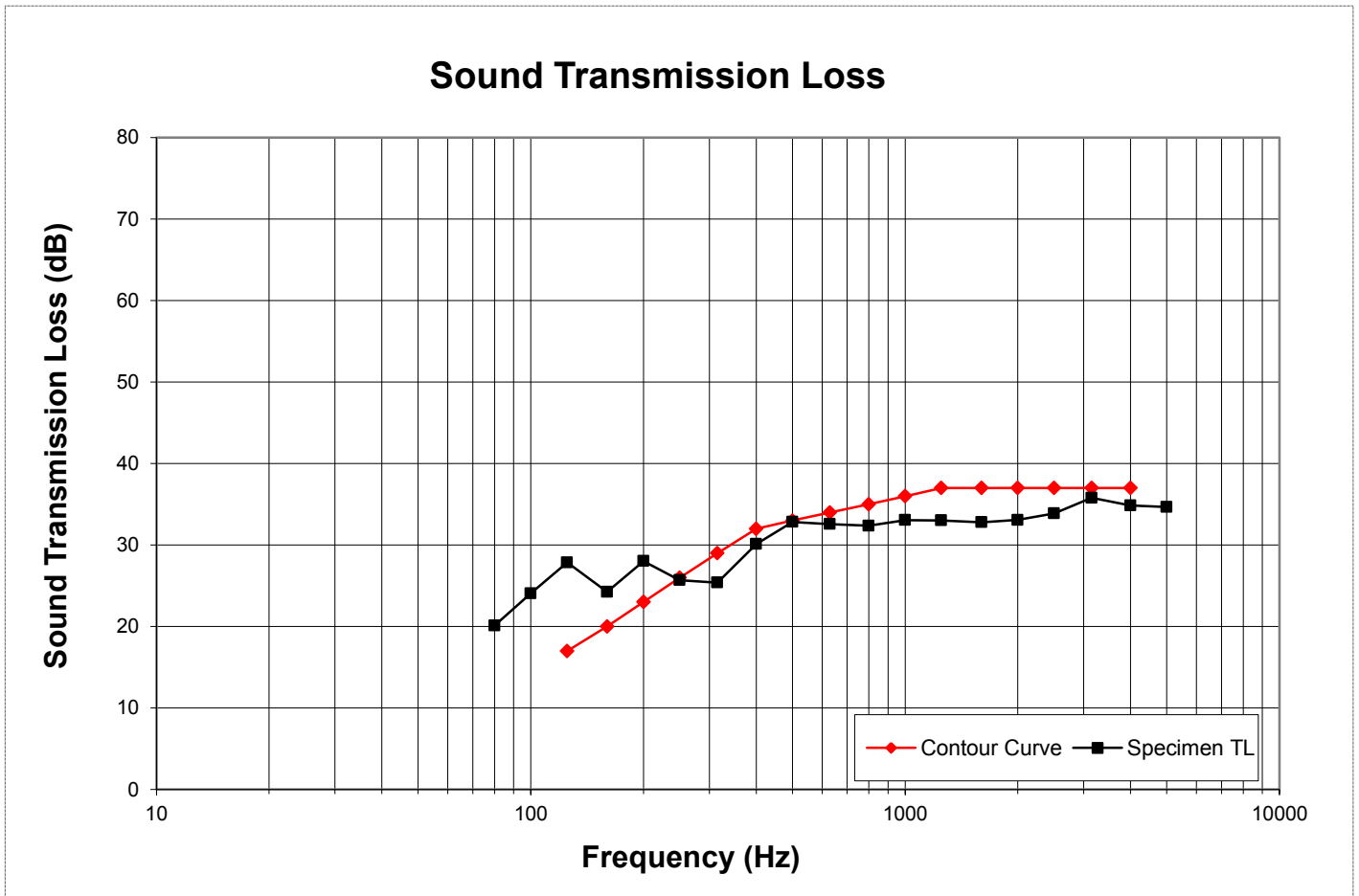
Freq (Hz)	Bkgrd SPL (dB)	Absorp (m ²)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	39	5.4	89	67	32	20	2.0	-	6.6
100	35	5.8	90	63	38	24	3.6	-	8.4
125	35	5.4	94	63	45	28	1.3	0	11.1
160	38	4.9	95	68	48	24	1.2	0	17.3
200	35	4.5	101	70	58	28	1.3	0	23.8
250	31	5.2	101	72	60	26	0.9	0	28.0
315	29	5.8	102	73	66	25	0.9	4	34.3
400	28	5.7	102	68	68	30	0.3	2	31.5
500	25	6.3	102	65	68	33	0.6	0	28.7
630	24	5.7	104	68	69	33	0.5	1	30.6
800	23	6.0	105	69	71	32	0.3	3	32.8
1000	20	6.2	105	68	74	33	0.5	3	35.1
1250	18	6.8	103	66	72	33	0.4	4	33.1
1600	15	6.9	106	69	71	33	0.4	4	32.1
2000	10	7.5	105	67	72	33	0.3	4	32.4
2500	7	8.3	105	65	75	34	0.3	3	34.7
3150	6	9.7	106	64	77	36	0.3	1	34.8
4000	6	11.9	106	64	81	35	0.4	2	39.8
5000	6	15.3	105	62	84	35	0.4	-	42.8

STC Rating **33** *(Sound Transmission Class)*
Deficiencies **31** *(Number of deficiencies versus contour curve)*
OITC Rating **30** *(Outdoor Indoor Transmission Class)*

- Notes:**
- 1) Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. These cells are highlighted red.
 - 2) Transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. These cells are highlighted green.
 - 3) Receive Room levels less than 5 dB above the background levels are highlighted in yellow.

SOUND TRANSMISSION LOSS
ASTM E 90

Test Date	03/25/13		
ATI No.	C5775.01		
Client	Tubelite, Inc.		
Specimen	Series/Model: T24000, side-hinged single door system with full lite 1-1/16" IG (1/4" heat strengthened exterior, 1/2" air space, 5/16" laminated interior), Glass temperature 75°F		
Operator	Kurt Golden		
Sample Area	2.50 m ²		
Filler Area	10.50 m ²		
	Source	Receive	Sample
Temp C	22	20	21
RH %	48	52	49



Note: To obtain the Sound Transmission Class (STC), read the Sound Transmission Loss of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve cannot exceed 32. The maximum deficiencies at any one frequency cannot exceed 8.

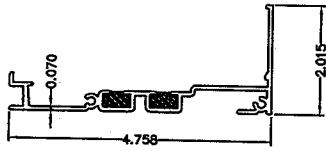
Appendix C
Design Drawings

Architectural Testing

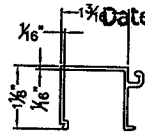
Test sample complies with these details.
Deviations are noted.

Report# C5775.01-113-11

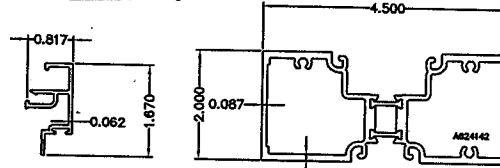
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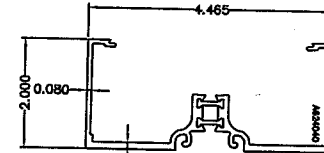
ITEM 1 - E24259
THERMAL SUB SILL



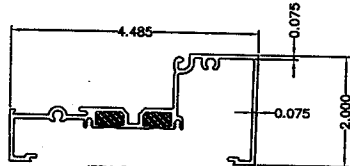
ITEM 8 - E14104
GLAZING STOP



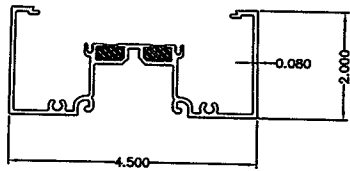
ITEM 18 - E6223
INNER DOOR STOP



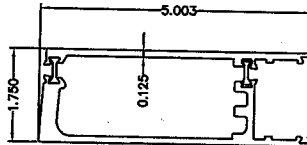
ITEM 20 - A624040
DOOR JAMB



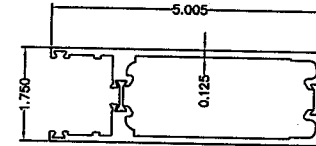
ITEM 2 - E24240
OPEN BACK SILL



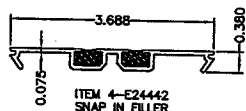
ITEM 3 - E24441
THERMAL OPEN BACK HEAD/JAMB/VERTICAL



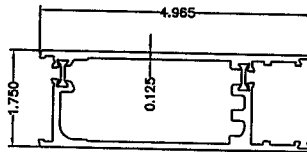
ITEM 11 - A627879
ASSEMBLY
MED STILE - HINGE



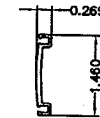
ITEM 12 - A628282
ASSEMBLY
MED RD FACE STILE



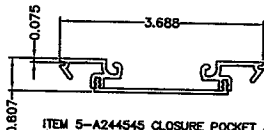
ITEM 4 - E24442
SNAP IN FILLER



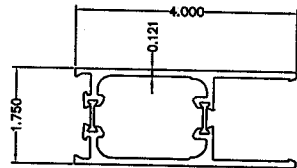
ITEM 13 - A628384
ASSEMBLY
MED STILE - LOCK W/ASTRAGAL



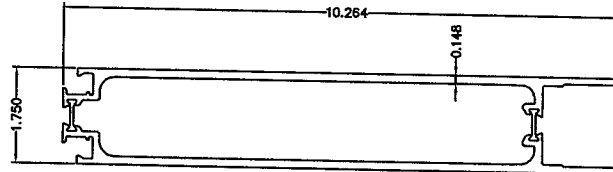
ITEM 14 - E1152
ASTRAGAL



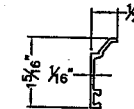
ITEM 5 - A244545 CLOSURE POCKET ASSEMBLY
ITEM 6 - E2445 CLOSURE POCKET SNAP
ITEM 7 - P6585 BRIDGE (PLASTIC)



ITEM 15 - A621414
ASSEMBLY
MED STILE TOP RAIL



ITEM 16 - A621010
ASSEMBLY
BOTTOM RAIL



ITEM 17 - E6291
GLAZING STOP

TUBELITE
NON IMPACT
T24000 STOREFRONT
THERMAL & ACOUSTIC TESTING

TUBELITE
DESIGNABLE
LEARNERS IN RESEARCH, STOREFRONT, STOREFRONT, CANTONWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE DRIVE N.W.
WALKER, MICHIGAN 49544
PH: 800.986.2327
FAX: 616.963.1000
WEB SITE: WWW.TUBELITEINC.COM

NO.	DATE	DESCRIPTION
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DATED: LATEST RELEASE
1-07-13 1-18-13

DRAWINGS BY: HLP
ENGINEERED BY:

TEST ELEVATION

5.0

5 OF 6

Appendix D

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen