ASTM E 90 SOUND TRANSMISSION LOSS
TEST REPORT

Rendered to:

C.R. LAURENCE CO., INC.

SERIES/MODEL: 8000

TYPE: Single Hung Window

Summary of Test Results			
Data File No.	**Glazing (Nominal Dimensions)**	**STC**	**OITC**
E2737.01	1" IG (1/4" tempered, 1/2" air space, 1/4" tempered)	29	26

Reference should be made to Architectural Testing, Inc. Report No. E2737.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

C.R. LAURENCE CO., INC.
2100 East 38th Street
Vernon, California 90058

Report No:	E2737.01-113-11
Test Date:	12/30/14
Report Date:	01/30/15

Test Sample Identification:

Series/Model: 8000

Type: Single Hung Window

Overall Size: 47-1/4" by 59"

Glazing (Nominal Dimensions): 1" IG (1/4" Tempered, 1/2" Air Space, 1/4" Tempered)

Project Scope: Architectural Testing, Inc. was contracted by C.R. Laurence Co., Inc. to conduct a sound transmission loss test on a Series/Model 8000, Single hung window. 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 window specimens. The filler wall achieved an STC rating of 68.

A filler wall-reducing element was used to adjust the test opening size. The reducing element consisted of two separate 2x6 wood frames filled with concrete to reduce the test opening size to accommodate the test specimen. A dense neoprene gasket was placed between the two wood and concrete frames. The window was placed on an isolation pad in the new test opening. Duct seal was used to seal the perimeter of the window to the test opening on both sides. The interior side of the window 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 vent was opened and closed at least five times prior to testing.

Test Procedure: The window 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	47-1/4" by 59"
Thickness	4-1/2"
Corners	Coped
Fasteners	Screws
Seal Method	Sealant
Material	Aluminum
Reinforcement	None
Thermal Break Material	Urethane
Daylight Opening Size	42-5/8" by 25"

Sample Descriptions: (Continued)

Sash Construction:

	Active Sash
Size	46" by 29-1/8"
Thickness	2"
Corners	Butted
Fasteners	Screws
Seal Method	None
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	Urethane
Daylight Opening Size	39-3/4" by 23"

Glazing:

Measured Overall Insulation Glass Unit Thickness	0.964"
Spacer Type	Aluminum

	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.222"	0.520"	0.222"
Muntin Pattern	N/A	N/A	N/A
Material	Tempered	Air*	Tempered
Laminate Material	N/A	N/A	N/A

Glazing Method	Interior
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		
0.270" by 0.270" Polypile triple fin	1 Row	Perimeter of frame and meeting rail
Hardware		
Spring loaded latch	2	Lock rail
Keeper	2	Sill
Handle bar	1	Lock rail
Drainage		
1-3/4" by 1/4" Weep slot	2	Sill face

Comments: The total weight of the sample was 146 lbs. The design drawings (included in Appendix C) supplied by the client, accurately describes the Series/Model 8000, Single hung window. The dimensions on the drawings that are circled and/or checked were verified against the test specimen. The window 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 8000, Single hung window is listed below.

Summary of Test Results			
Data File No.	**Glazing (Nominal Dimensions)**	**STC**	**OITC**
E2737.01	1" IG (1/4" tempered, 1/2" air space, 1/4" tempered)	29	26

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. The test record retention period ends four years after the test date.

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: Zachary Golden

Zachary Golden
Technician - Acoustical Testing

Digitally Signed by: Todd D. Kister

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

ZPG:jmcs

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 (6)
- Appendix-D: Photographs (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	01/30/15	N/A	Original Report Issue

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-1033	Data Acquisition card	65127	04/14 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	12/14
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64903	12/14
Source Room Microphone	PCB Electronics	378B20	Microphone and Preamplifier	65103	05/14
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64905	12/14
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64906	12/14
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	11/14
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	11/14
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	11/14
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	11/14
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	11/14
Receive Room Environmental Indicator	Vaisala	HMW92	Temperature Humidity Sensor	64286	06/14
Source Room Environmental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	Y002653	06/14
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	04/14

**- 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

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AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	12/30/14					
Data File No.	E2737.01					
Client	C.R. Laurence Co., Inc.					
Description	Series/Model: 8000, Single hung window with 1" IG (1/4" tempered, 1/2" air space, 1/4" tempered)					
Specimen Area	1.80 m²	Receive Temp.	22.8 °C		Source Temp.	21.8 °C
Technician	Zach Golden	Receive Humidity	53%		Source Humidity	50%

Freq (Hz)	**Background SPL** (dB)	**Absorption** (m²)	**Source SPL** (dB)	**Receive SPL** (dB)	**Specimen TL** (dB)	**95% Confidence Limit**	**Number of Deficiencies**
80	35.9	4.2	107	81	23.5	2.08	-
100	39.9	4.9	108	77	28.4	1.80	-
125	36.8	4.5	108	76	27.8	0.92	0
160	34.9	4.4	107	83	19.8	0.53	0
200	33.0	4.5	107	82	21.8	0.55	0
250	30.6	4.8	107	79	23.4	1.25	0
315	25.6	5.4	103	73	24.6	0.50	0
400	25.2	5.8	102	72	25.0	0.44	3
500	23.8	5.8	103	72	25.7	0.28	3
630	20.5	5.6	103	73	25.7	0.36	4
800	16.7	5.8	103	71	27.1	0.35	4
1000	12.2	6.0	102	68	28.4	0.27	4
1250	11.2	6.8	100	64	30.4	0.28	3
1600	8.2	7.1	103	65	32.4	0.36	1
2000	4.7	7.5	101	64	30.9	0.18	2
2500	4.5	8.3	100	61	32.3	0.16	1
3150	4.4	10.0	100	58	34.9	0.26	0
4000	5.2	11.9	99	54	37.2	0.13	0
5000	5.7	14.9	97	47	41.0	0.26	-

STC Rating	**29**	*(Sound Transmission Class)*
Deficiencies	25	*(Sum of Deficiencies)*
OITC Rating	**26**	*(Outdoor-Indoor Transmission Class)*

Notes:

1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.
2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

Intertek | Architectural Testing

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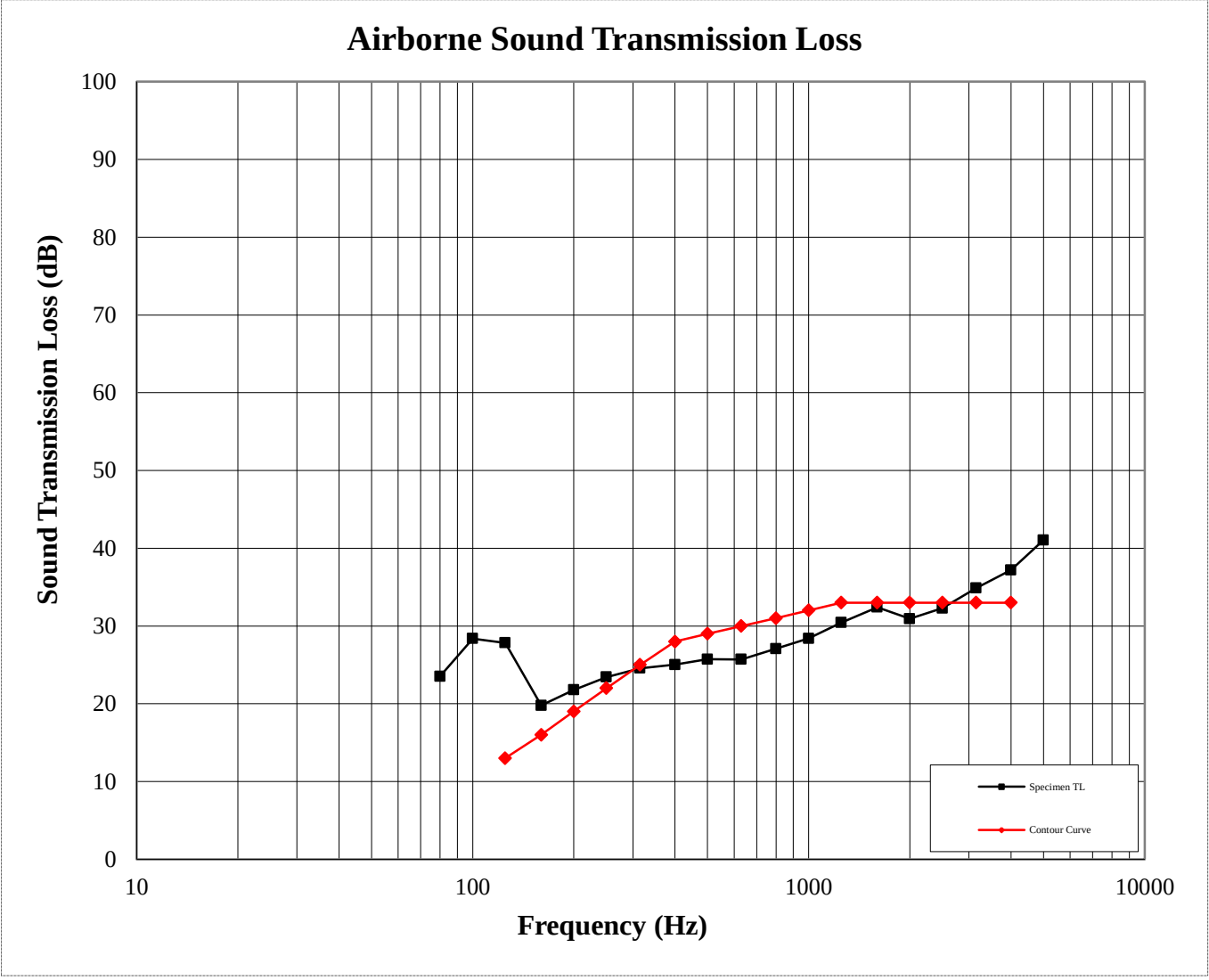
AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

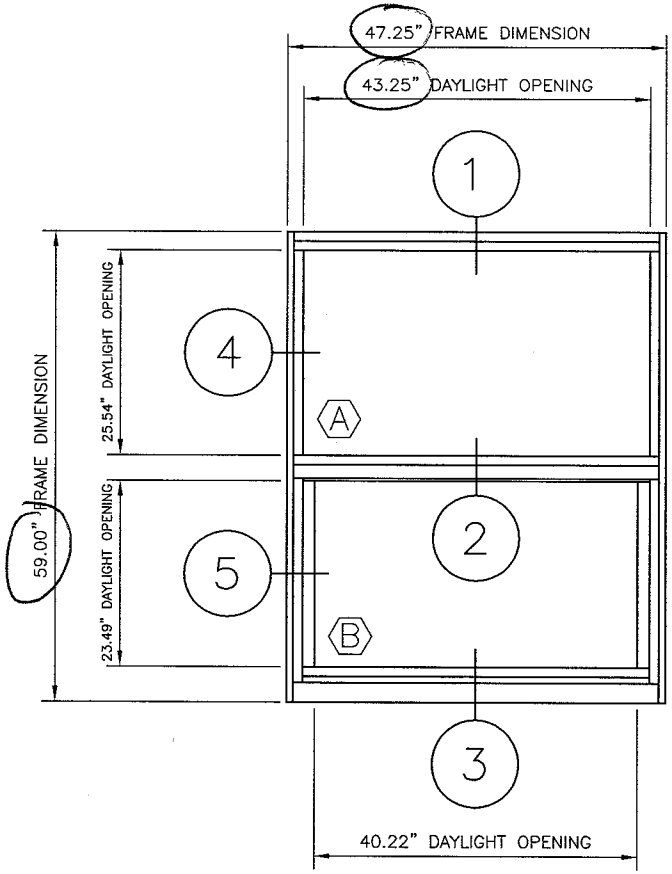
Test Date	12/30/14						
Data File No.	E2737.01						
Client	C.R. Laurence Co., Inc.						
Description	Series/Model: 8000, Single hung window with 1" IG (1/4" tempered, 1/2" air space, 1/4" tempered)						
Specimen Area	1.80 m²	Receive Temp.	22.8 °C		Source Temp.	21.8 °C	
Technician	Zach Golden	Receive Humidity	53%		Source Humidity	50%	



Appendix C

Design Drawings

MU2014-178-01



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737.01-113-11

Date 1/27/15 Tech ZPG

SYMBOL KEY		
SYMBOL	DESCRIPTION	QTY.
Ⓐ	1" INSULATED GLASS 45.250 X 27.539 .250 CLR, TEMPERED .500 MILL ALUM SPACER, AIR .250 PPG SOLARBAN 70XL, LOW-E #3 SURFACE, SILICONE	1
Ⓑ	1" INSULATED GLASS 42.220 X 25.487 .250 CLR, TEMPERED .500 MILL ALUM SPACER, AIR .250 PPG SOLARBAN 70XL, LOW-E #3 SURFACE, SILICONE	1

REV.	DESCRIPTION	DATE	BY

CRL US ALUMINUM

C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWN BY: GHK

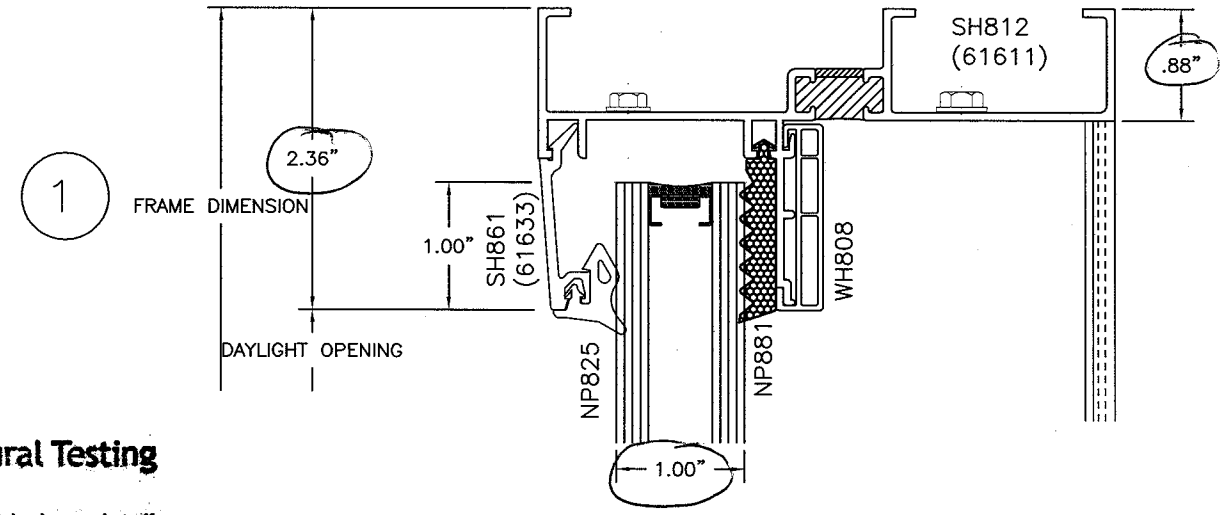
DATE: 06.27.14

SCALE: $\frac{3}{4}$"=1'-0"

TITLE:
SOUND TRANSMISSION LOSS TEST
ELEVATION
PRODUCT: 8000 SINGLE HUNG WINDOW

DRAWING NO.
MU2014-178-01

MU2014-178-01



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737.01-113-11

Date 1/27/15 Tech ZPG

REV.	DESCRIPTION	DATE	BY

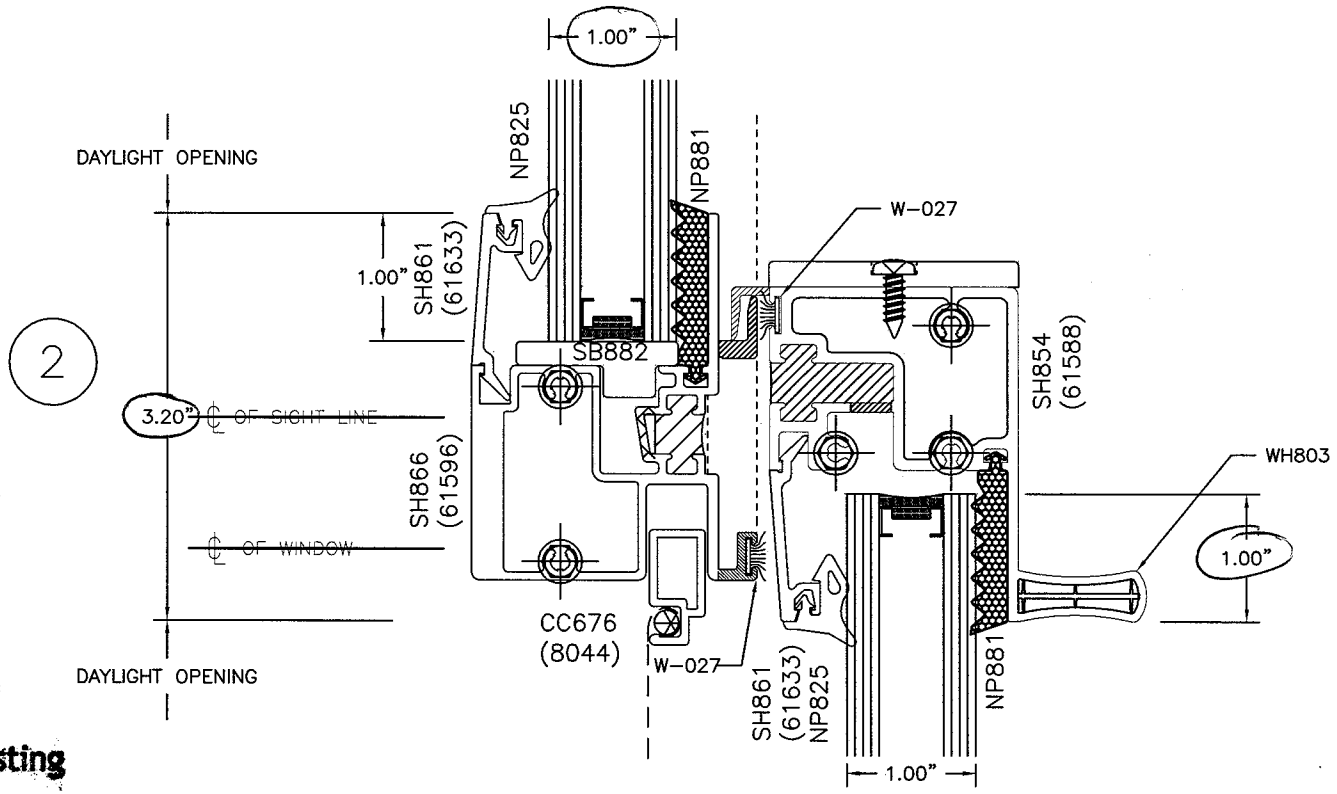
C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWN BY: GHK
DATE: 06.27.14
SCALE: FULL

TITLE:
SOUND TRANSMISSION LOSS TEST
HORIZONTAL SECTION
PRODUCT: 8000 SINGLE HUNG WINDOW

DRAWING NO.
MU2014-178-01

MU2014-178-01



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737.01-113-11

Date 1/27/15 Tech ZPG

REV.	DESCRIPTION	DATE	BY

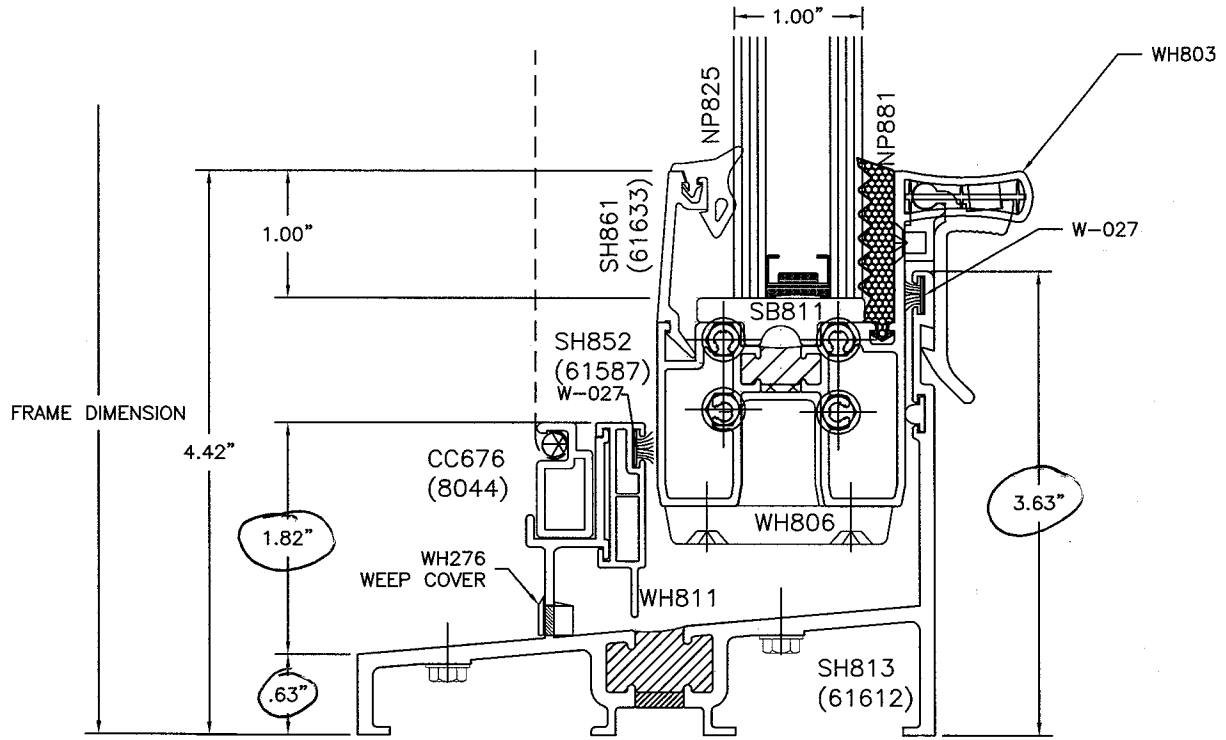
C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWN BY: GHK
DATE: 06.27.14
SCALE: FULL

TITLE:
SOUND TRANSMISSION LOSS TEST
VERTICAL SECTION
PRODUCT: 8000 SINGLE HUNG WINDOW

DRAWING NO.
MU2014-178-01

MU2014-178-01



3

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737.01-113-11

Date 1/22/15 Tech 206

REV.	DESCRIPTION	DATE	BY

C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWN BY: GHK

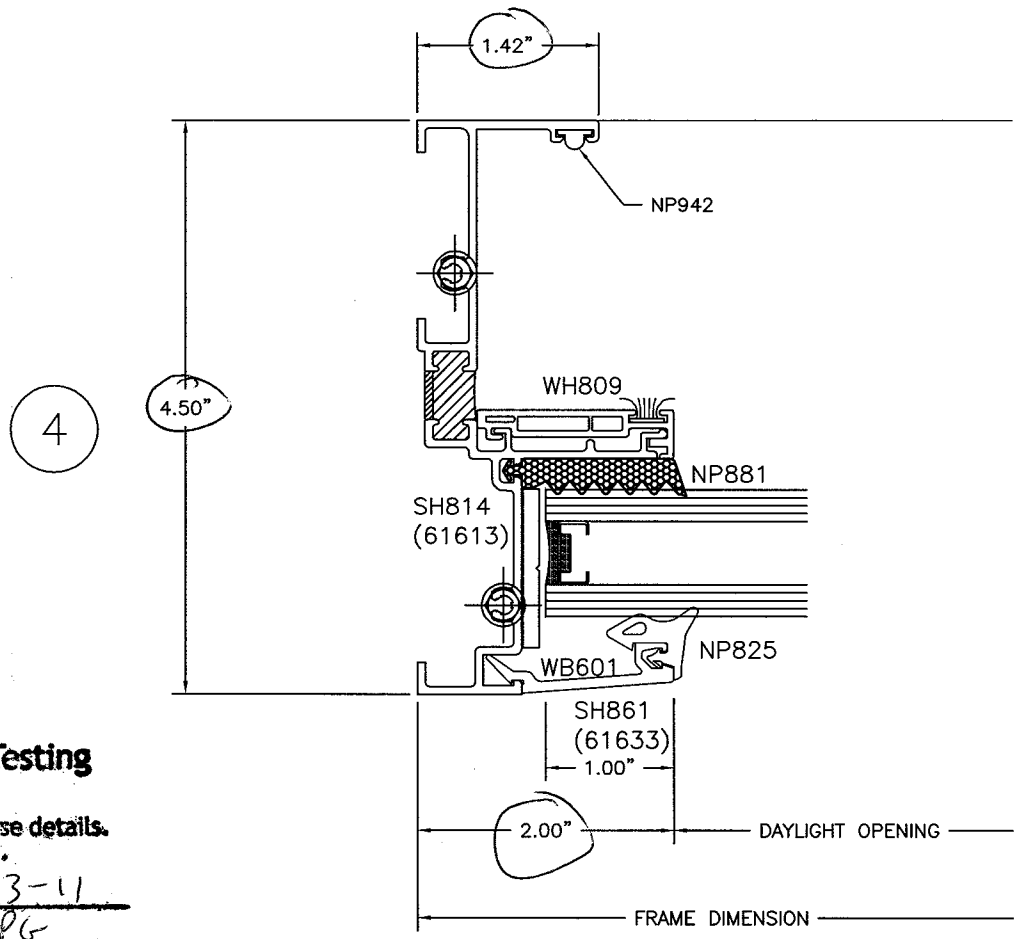
DATE: 06.27.14

SCALE: $\frac{3}{4}$"=1'-0"

TITLE:
SOUND TRANSMISSION LOSS TEST
ELEVATION
PRODUCT: 8000 SINGLE HUNG WINDOW

DRAWING NO.
MU2014-178-01

MU2014-178-01



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737.01-113-11

Date 1/27/15 Tech ZPG

REV.	DESCRIPTION	DATE	BY

DRAWN BY: GHK

DATE: 06.27.14

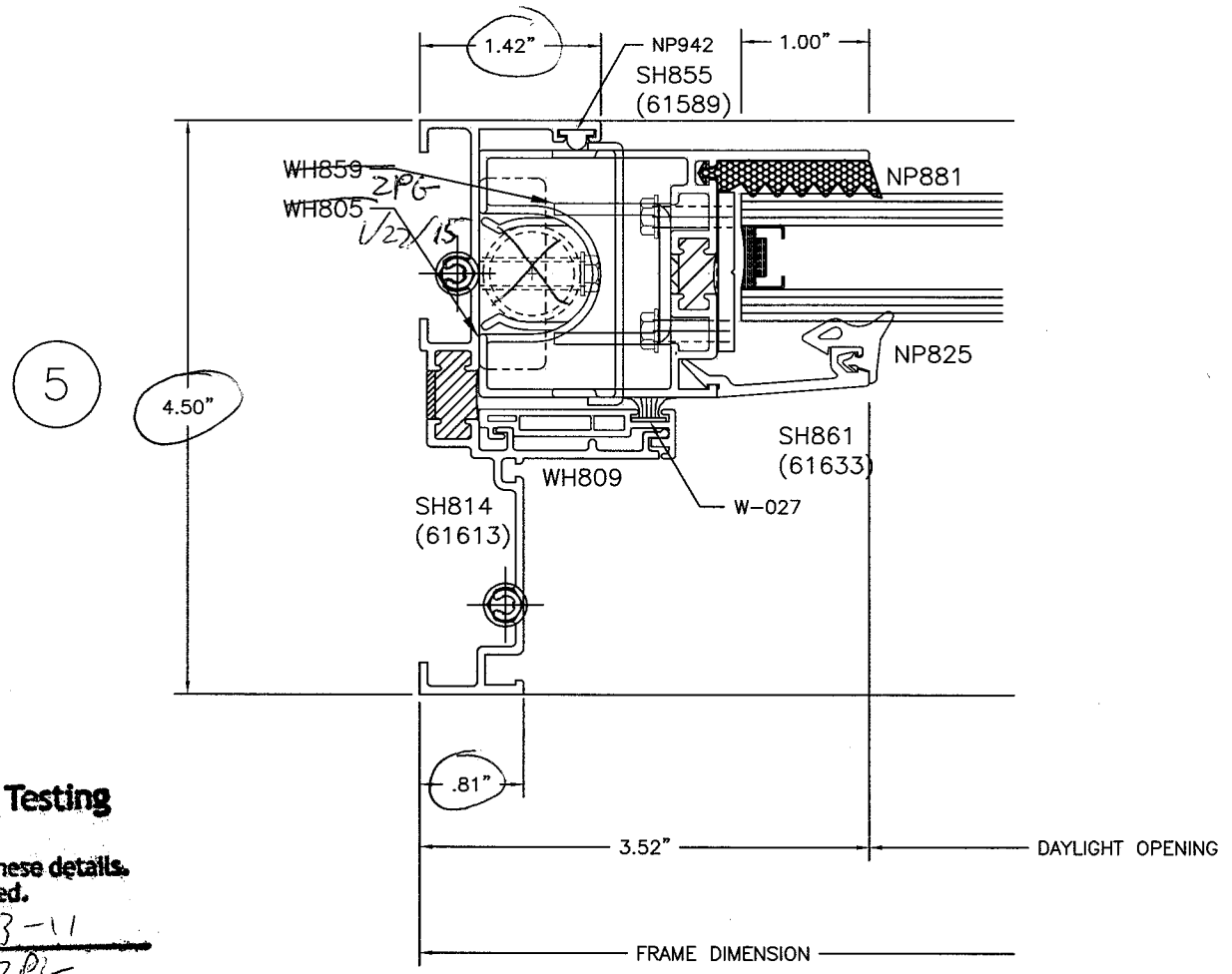
SCALE: FULL

TITLE: SOUND TRANSMISSION LOSS TEST
HORIZONTAL SECTION
PRODUCT: 8000 SINGLE HUNG WINDOW

C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWING NO. MU2014-178-01

MU2014-178-01



5

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# E2737,01-113-11

Date 1/27/15 Tech ZPG

REV.	DESCRIPTION	DATE	BY

C.R. LAURENCE CO., INC.
CRL MANUFACTURING
2100 E. 38TH STREET
LOS ANGELES, CA 90058

DRAWN BY: GHK
DATE: 06.27.14
SCALE: FULL

TITLE:
SOUND TRANSMISSION LOSS TEST
VERTICAL SECTION
PRODUCT: 8000 SINGLE HUNG WINDOW

DRAWING NO.
MU2014-178-01

Sheet No. 6 of 6 Sheets

Appendix D

Photographs

Receive Room View of Installed Specimen

Source Room View of Installed Specimen