NORTH ORBIT ACOUSTIC LABORATORIES

REPORT NUMBER	NOAL 25-06065
TEST METHOD	ASTM E90-23: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements
TEST SPONSOR	Indow Windows, 6427 NE 59th Place, Portland, OR 97218
ISSUED TO	Indow Windows, 6427 NE 59th Place, Portland, OR 97218
TEST SPECIMEN	Fixed Window with Insert
RESULT SUMMARY	STC 43, OITC 31
TEST DATE	June 25, 2025
REPORT DATE	July 9, 2025
TEST SITE	North Orbit Acoustic Laboratory Facility, 917 Rice Street, Saint Paul, MN 55117
TECHNICIAN	D. Berg

CONTENTS

ELECTRONICALLY REPRODUCED SIGNATURE

DAVID M. BERG – LABORATORY MANAGER

ELECTRONICALLY REPRODUCED SIGNATURE

HEIDE GROSS – LABORATORY QUALITY MANAGER

ilac-MRA A2LA ACCREDITED

TEST SPONSOR Indow Windows
6427 NE 59th Place
Portland, OR 97218

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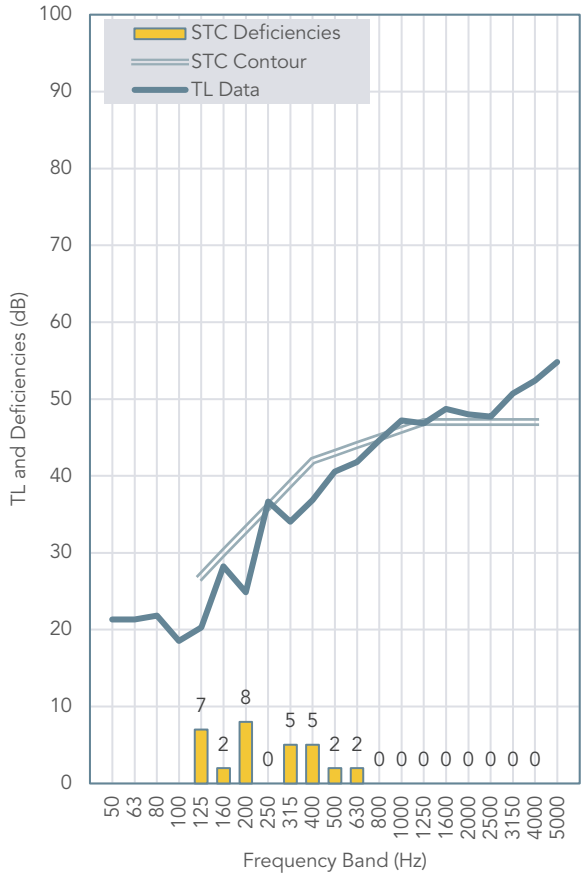
SECTION A – DATA SUMMARY

STC 43, OITC 31



FREQUENCY (Hz)	TL (dB)	DEFICIENCIES (dB)
50	21	-
63	21	-
80	22	-
100	19	-
125	20	7
160	28	2
200	25	8
250	37	0
315	34	5
400	37	5
500	41	2
630	42	2
800	45	0
1,000	47	0
1,250	47	0
1,600	49	0
2,000	48	0
2,500	48	0
3,150	51	0
4,000	52	0
5,000	55	-
	TOTAL DEFICIENCIES	**31**

ELEMENTS	
Primary window	Fixed aluminum storefront window
Dimensions	39.5" x 51.5" [1.00 m x 1.31 m]
Glass makeup	1/4" clear tempered
Air space	1-1/4"
	IndowPRO frame mounted on interior of Primary window frame
Secondary Window	IndowPRO frame with 5/16" Acoustic Laminate
Dimensions	36" x 48" [0.914 m x 1.21 m]

See Section C on page 4 and 5 for a full specimen description.

SECTION B – APPROACH

INSTALLATION

The specimen is a window that was installed on June 24, 2025, at the Saint Paul, MN acoustic laboratory facility. The assembly and building element descriptions can be found in Section C on pages 4 & 5 of this report.

Qualified representatives from North Orbit Acoustic Laboratories observed or performed the installation and inspected all major building elements when completed and prior to testing.

TEST METHODS

North Orbit Acoustic Laboratory (NOAL) is accredited through A2LA certificate number 4240.01 for this test method.

Test methods follow the published standards listed below.

ASTM E90-23: *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-22: *Classification for Rating Sound Insulation*

ASTM E1332-22: *Classification for Outdoor-Indoor Sound Attenuation*

All results reported herein were derived from tests performed in full accordance with test method ASTM E90. The laboratory and measurement systems fully meet all requirements of the test standard and the requirements of ASTM E90 Annex A2: Qualification of room sound fields and microphone systems used for sampling. All values stated are derived from single-direction transmission loss measurements.

The standard deviation of reproducibility is stated in ASTM E90 as <2 dB for frequencies from 125 Hz to 4 kHz. Detailed test procedures for this test method, the flanking limit report, repeatability measurements and reference specimen tests are available upon request.

The Sound Transmission Class (STC) value was obtained by applying the Transmission Loss (TL) values to the STC reference contour of ASTM E413 which was used to calculate a single number rating. The Outdoor-Indoor Transmission Class (OITC) value was obtained by applying the TL values to the calculation procedure in ASTM E1332.

FILLER WALL

A high-transmission-loss filler wall was constructed in the entire 12' x 8' test opening, consisting of two individual decoupled frames separated by an airspace, with studs installed 24" on centers (OC). Glass fiber batt insulation was friction fit in each stud cavity of each frame. On the source side, a single layer of 5/8" Type gypsum drywall was attached directly to the frame. On the receiving room side, a layer of 5/8" thick, Type X gypsum panels was installed over a layer of ½" constrained layer, damped gypsum panels. Both layers were applied and attached directly to the frame. The overall thickness of the assembled filler wall was 12.75". The filler wall assembly was tested, and the results were retained for composite wall corrections. The filler wall was then modified to provide a decoupled opening to accommodate the specimen under test according to the requirements of ASTM E90 Annex A3: *Procedures for Dealing with Specimens Smaller than the Test Opening.*

TEST REPORTS

This report does not constitute certification of the assembly or test item nor an opinion or endorsement by this laboratory. The report applies only to the specimen tested and may not be reproduced, except in full, without the permission of the client or test sponsor. It is the exclusive property of the test sponsor so named herein.

CONFIDENTIALITY

The test sponsor has full control over this information. Any release of information will be only to the test sponsor. The specific testing results are deemed to be confidential exclusively for the test sponsor's use. Reproduction of this report, except in full, is prohibited.

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SECTION C – SPECIMEN DESCRIPTION

The test specimen consists of a fixed aluminum storefront window, with an IndowPRO Secondary Window installed on the receiving room side. The secondary window is mounted to the interior of the storefront frame, creating a 1.25" air gap between it and the primary window glazing.

The test laboratory provided materials to build the filler wall assembly. The Test Sponsor supplied all other test specimen materials.

TEST SPECIMEN		
Specimen Dimensions	39.5" [1.00 m] x 51.5" [1.31 m]	
Specimen Face Area	14.1 SF [1.31 m²]	
Total Daylight Area	10.2 SF [0.95 m²] or 72%	
Overall Mass	108 lb [49.0 kg]	
Overall Surface Density	7.65 PSF [37.3 kg/m²]	
WINDOW DETAILS		
Window Type	Fixed window with insert	
Primary Window Frame	1.75" x 4.50" deep extruded aluminum assembly	
Secondary Window Frame	1.625" x 1.06" deep extruded aluminum assembly	
GLASS PANES		
Identification	Fixed aluminum storefront window	
Dimensions	39.5" [1.00 m] x 51.5" [1.31 m]	
Daylight Opening	36.0" [0.91 m] x 48.0" [1.22 m]	
Daylight Area	12.0 SF [1.15 m²]	
Glass Makeup	0.25" [6.35 mm] annealed	
Air Space	1.25" [3.18 cm]	
	IndowPRO frame mounted on interior of Primary window frame	
Identification	IndowPRO secondary glazing frame	
Dimensions	36.0" [0.91 m] x 48.0" [1.22 m]	
Daylight Opening	32.8" [0.83 m] x 44.8" [1. 14 m]	
Daylight Area	10.2 SF [0.95 m²]	
Glass Makeup	5/16" [7.94 mm] acoustic laminated	0.1250" [3.18 mm] annealed 0.0300" [0.76 mm] PVB interlayer 0.1875" [4.76 mm] annealed

The Primary window frame was shimmed at installation so equal gaps were maintained at the top and bottom. Gaps were less than 3/8" in all cases. The perimeter was sealed on the source and receiving room sides with non-hardening acoustical sealant. In addition, the perimeter of both sides of the specimen was sealed with 2" wide polypropylene tape and 7/8" dense putty tape.

The IndowPro secondary glazing frame was held in place with integral perimeter bulb and foam corner seals.

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SECTION D – MEASUREMENT SET-UP

ENVIRONMENTAL CONDITIONS	
Source Room Temperature	72.6 °F [22.6 °C]
Source Room Relative Humidity	53.5%
Receiving Room Temperature	72.7 °F [22.6 °C]
Receiving Room Relative Humidity	52.8%

CHAMBER VOLUME	
Source Room	7,642 CF [216.4 m³]
Receiving Room	12,320 CF [348.7 m³]
Source Niche Depth	6.50" [16.5 cm]
Receiving Niche Depth	5.75" [14.6 cm]

INSTRUMENTATION

DESCRIPTION	BRAND	MODEL	SERIAL
Analyzer	Sinus	Apollo	7510
Software	Sinus	Samurai	ver. 2.8.3
Microphone	Brüel & Kjær	4166	1620281
Microphone	Brüel & Kjær	4166	1620312
Preamplifier	Brüel & Kjær	2669	2025373
Preamplifier	Brüel & Kjær	2669	2083679
Calibrator	Brüel & Kjær	4231	2314028
Thermohygrometer	Kestrel	5200	2807716
Thermohygrometer	Kestrel	5200	2947354

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SECTION E – TEST RESULTS

FREQUENCY BAND (Hz)	TL (dB)	DATA FLAGS (see below)	95% C.I. (dB)	FLANKING LIMIT (dB)	DEFICIENCIES (dB)
50	21.3	†	±3.9	44.8	-
63	21.3	†	±4.0	46.8	-
80	21.8	†	±3.0	52.8	-
100	18.6	‡	±1.6	59.2	-
125	20.3	‡	±1.7	65.2	7
160	28.2	‡	±1.4	69.7	2
200	24.8		±1.1	72.8	8
250	36.6	‡	±0.6	77.7	0
315	34.0		±0.6	82.6	5
400	36.9		±0.5	88.3	5
500	40.6		±0.5	93.4	2
630	41.8		±0.4	95.6	2
800	44.6		±0.5	100.5	0
1,000	47.2		±0.4	105.0	0
1,250	46.9		±0.4	107.9	0
1,600	48.7		±0.3	105.9	0
2,000	48.0		±0.5	106.0	0
2,500	47.7		±0.3	105.7	0
3,150	50.7		±0.4	105.2	0
4,000	52.4		±0.4	103.4	0
5,000	54.8		±0.5	100.7	-
				TOTAL DEFICIENCIES BELOW CONTOUR [dB]	**31**
				STC RATING [ASTM E413]	**43**
				OITC RATING [ASTM E1332]	**31**

Note: Composite 95% confidence intervals from room qualification testing. Extended frequency results below 80 Hz and above 5000 Hz are for reference only. Specimen TL rounded to 0.1 dB provided in this table for reference. Specimen TL rounded to whole decibels found on page 2.

Data Flags:

‡ Correction included in calculation due to a portion of the sound transmitted by way of the filler wall. Sound transmission through the filler wall is within correction limits established in ASTM E90.

† Actual transmission loss of specimen may be higher than measured at this frequency band. Sound transmission through the filler wall exceeds correction limits established in ASTM E90; therefore the result is "an estimate of the lower limit".