

9 WOOD, INC. ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK

ASTM C423 SOUND ABSORPTION TESTING ON PLAIN PLANKS WITH DUCT LINER,
ABSORPTION PANELS

REPORT NUMBER

K9724.03-303-11-R0

TEST DATE

05/20/20

ISSUE DATE

06/17/20

RETENTION DATE

06/17/24

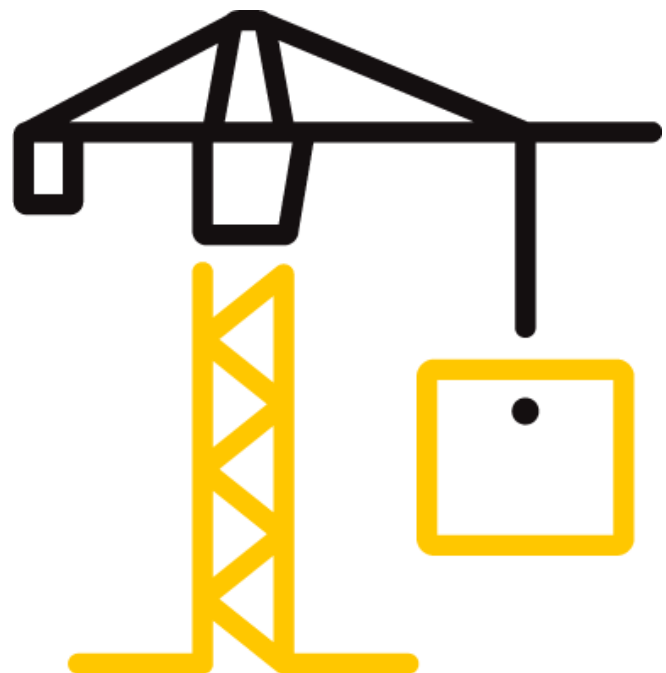
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10

DOCUMENT CONTROL NUMBER

RT-R-AMER-Test-2755 (01/24/19)

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TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

REPORT ISSUED TO

9 WOOD, INC.

999 South A Street

Springfield, Oregon 97477

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by 9 Wood, Inc. to perform a sound absorption test. Results obtained are tested values and were secured by using the designated test methods. The complete test data is included herein. The client provided the test specimen. All measurements were conducted in the HT test chambers at Intertek B&C located in Lake Forest, California.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Intertek B&C will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained for the entire test record retention period.

For INTERTEK B&C:

| | | | |
|----------------------|---------------------|---------------------|--------------------|
| COMPLETED BY: | Marco T. Santa Rosa | REVIEWED BY: | Leeland S Hoover |
| | Technician II | | Laboratory Manager |
| TITLE: | Acoustical Testing | TITLE: | Acoustical Testing |
| | | | |
| SIGNATURE: | | SIGNATURE: | |
| DATE: | 06/17/20 | DATE: | 06/17/20 |

MTSR:LSH

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TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

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SECTION 2

SUMMARY OF TEST RESULTS

| | | | | | | | | |
|----------------------|--|------------|------------|-------------|-------------|-------------|------------|------------|
| SERIES/MODEL | Plain Planks With Duct Liner | | | | | | | |
| SAMPLE TYPE | Absorption Panel | | | | | | | |
| MOUNTING TYPE | E400 | | | | | | | |
| DATA FILE NO. | 1/3 OCTAVE SOUND ABSORPTION COEFFICIENTS AT THE OCTAVE BAND FREQUENCIES | | | | | | NRC | SAA |
| | 125 | 250 | 500 | 1000 | 2000 | 4000 | | |
| K9724.01C | 0.78 | 0.78 | 0.79 | 0.49 | 0.42 | 0.50 | 0.60 | 0.65 |

SECTION 3

TEST METHODS

The specimens were evaluated in accordance with the following:

ASTM C423-17, *Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method*

ASTM E795-16, *Standard Practices for Mounting Test Specimens During Sound Absorption Tests*

SECTION 4

SPECIMEN MOUNTING

For the Type E-400 mounting, the specimen was placed on the Type E test assembly so that the absorptive face of specimen was suspended 400 mm above the floor of the reverberation room. The perimeter of the specimen was sealed to the test assembly with duct tape. The perimeter of the test assembly was sealed to the floor with duct tape.

TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 5 EQUIPMENT

The equipment listed below meets the requirements of the test methods stated in Section 3 of this report.

EQUIPMENT

| INSTRUMENT | MANUFACTURER | MODEL | DESCRIPTION | ASSET # | CAL DATE |
|--------------------------------------|----------------------|-----------|-----------------------------|----------|----------|
| Data Acquisition Card | National Instruments | PXIe-4464 | Data Acquisition Card | INT00392 | 09/19 |
| Data Acquisition Card | National Instruments | PXIe-4464 | Data Acquisition Card | INT00397 | 10/19 |
| Data Acquisition Card | National Instruments | PXIe-4464 | Data Acquisition Card | INT00395 | 10/19 |
| Receive Room Microphone | PBC Piezotronics | 378C20 | Microphone and Preamplifier | INT00229 | 04/20 |
| Receive Room Microphone | PCB Piezotronics | 378C20 | Microphone and Preamplifier | INT00230 | 04/20 |
| Receive Room Microphone | PCB Piezotronics | 378C20 | Microphone and Preamplifier | INT01542 | 04/20 |
| Receive Room Microphone | PCB Piezotronics | 378C20 | Microphone and Preamplifier | INT00232 | 04/20 |
| Receive Room Microphone | PCB Piezotronics | 378C20 | Microphone and Preamplifier | INT00233 | 04/20 |
| Receive Room Environmental Indicator | Comet | T7510 | Receive Room | INT00299 | 05/19 |
| Microphone Calibrator | Norsonic | 1251 | Acoustical Calibrator | INT00289 | 09/19 |

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

TEST CHAMBER

| | VOLUME | DESCRIPTION |
|--------------|--------------------|---|
| RECEIVE ROOM | 231 m ³ | Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor |

N/A-Not Applicable

TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 6

LIST OF OFFICIAL OBSERVERS

| NAME | COMPANY |
|------------------|--------------|
| Marco Santa Rosa | Intertek B&C |
| Josue Vides | Intertek B&C |

SECTION 7

TEST PROCEDURE

The sensitivity of the microphones was checked before measurements were conducted. Empty room sound absorption measurements were conducted before the specimen was installed. Full room sound absorption measurements were conducted after the specimen was installed.

For the empty and full room measurements, ten decay measurements were conducted at each of the five microphone positions. Data was obtained at 1/3 octave band frequencies ranging from 80 to 5000 hertz. The air temperature and relative humidity conditions were monitored and recorded during the measurements.

The specimen was returned per the client's request.

SECTION 8

TEST CALCULATIONS

The Sound Absorption Coefficient is the full room absorption minus the empty room absorption divided by the area of the sample in m². The Sound Absorption Coefficient is dimensionless.

The Noise Reduction Coefficient (NRC) rating is the arithmetic average of the sound absorption coefficients at 250, 500, 1000 and 2000 hertz. The average is rounded to the nearest multiple of 0.05.

The Sound Absorption Average (SAA) rating is the arithmetic average of the sound absorption coefficients at the frequencies ranging from 200 to 2500 hertz. The average is rounded to the nearest multiple of 0.01.

TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 9

TEST SPECIMEN DESCRIPTION

| | |
|----------------------|------------------------------|
| SERIES/MODEL | Plain Planks With Duct Liner |
| SAMPLE TYPE | Absorption Panel |
| MOUNTING TYPE | E400 |

Fifteen, 2.44 m by 0.20 m (96" by 7-3/4"), panels were arranged to produce the 2.44 m by 2.74 m (96" by 108") test specimen. The total weight of the specimen was 82 kg (180.8 lbs).

| DESCRIPTION | THICKNESS | WEIGHT |
|--------------------|-------------------|---|
| Plain Planks | 0.03 mm 3/4" | 12.01 kg/m ² 2.46 lbs/ft ² |
| Duct Liner | 38.1 mm 1-1/2" | 1.07 kg/m ² 0.22 lbs/ft ² |

* - Stated per Client/Manufacturer

Photographs are included in Section 11.

The client did not supply a report drawing of the test specimen.

TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 10

TEST RESULTS

ASTM C423 SOUND ABSORPTION TEST



| | | |
|---------------|--|------|
| TEST DATE | 05/20/20 | |
| DATA FILE NO. | K9724.01C | |
| CLIENT | 9Wood, Inc | |
| DESCRIPTION | Series/Model: Plain Planks With Duct Liner | |
| TECHNICIAN | Marco T Santa Rosa | |
| SPECIMEN AREA | 6.69 m ² | |
| MOUNTING TYPE | E400 | |
| | EMPTY | FULL |
| TEMP °C | 20.4 | 20.8 |
| RH % | 51 | 52 |
| B.P. (mb) | 1018 | 1018 |

| FREQ (Hz) | EMPTY ROOM ABSORPTION (m ²) | UNCERTAINTY | FULL ROOM ABSORPTION (m ²) | UNCERTAINTY | ABSORPTION COEFFICIENT | RELATIVE UNCERTAINTY |
|--------------|---|-------------|--|-------------|---------------------------|-------------------------|
| 80 | 6.05 | 0.148 | 10.76 | 0.127 | 0.70 | 0.029 |
| 100 | 7.59 | 0.106 | 12.78 | 0.104 | 0.78 | 0.022 |
| 125 | 8.44 | 0.061 | 13.65 | 0.069 | 0.78 | 0.014 |
| 160 | 8.43 | 0.098 | 13.33 | 0.025 | 0.73 | 0.015 |
| 200 | 7.08 | 0.084 | 11.75 | 0.010 | 0.70 | 0.013 |
| 250 | 5.94 | 0.038 | 11.14 | 0.032 | 0.78 | 0.007 |
| 315 | 6.03 | 0.019 | 11.84 | 0.013 | 0.87 | 0.003 |
| 400 | 5.81 | 0.034 | 11.46 | 0.016 | 0.84 | 0.006 |
| 500 | 5.76 | 0.023 | 11.02 | 0.036 | 0.79 | 0.006 |
| 630 | 5.81 | 0.012 | 10.41 | 0.008 | 0.69 | 0.002 |
| 800 | 6.28 | 0.021 | 10.13 | 0.018 | 0.57 | 0.004 |
| 1000 | 7.41 | 0.010 | 10.67 | 0.003 | 0.49 | 0.002 |
| 1250 | 8.19 | 0.017 | 11.13 | 0.009 | 0.44 | 0.003 |
| 1600 | 8.90 | 0.007 | 11.94 | 0.009 | 0.46 | 0.002 |
| 2000 | 10.45 | 0.009 | 13.24 | 0.186 | 0.42 | 0.028 |
| 2500 | 12.98 | 0.011 | 17.65 | 0.182 | 0.70 | 0.027 |
| 3150 | 16.84 | 0.006 | 21.01 | 0.005 | 0.62 | 0.001 |
| 4000 | 22.48 | 0.008 | 25.82 | 0.005 | 0.50 | 0.001 |
| 5000 | 30.42 | 0.007 | 32.59 | 0.004 | 0.33 | 0.001 |

| | | |
|------------|------|-------------------------------|
| NRC RATING | 0.60 | (Noise Reduction Coefficient) |
| SAA RATING | 0.65 | (Sound Absorption Average) |

Notes:

- 1) The NRC rating is the arithmetic average of the sound absorption coefficients at 250, 500, 1000, and 2000 hertz. The average is rounded to the nearest multiple of 0.05.
- 2) The SAA rating is the arithmetic average of the sound absorption coefficients at the frequencies ranging from 200 to 2500 hertz. The average is rounded to the nearest multiple of 0.01.

TEST REPORT FOR 9 WOOD, INC.

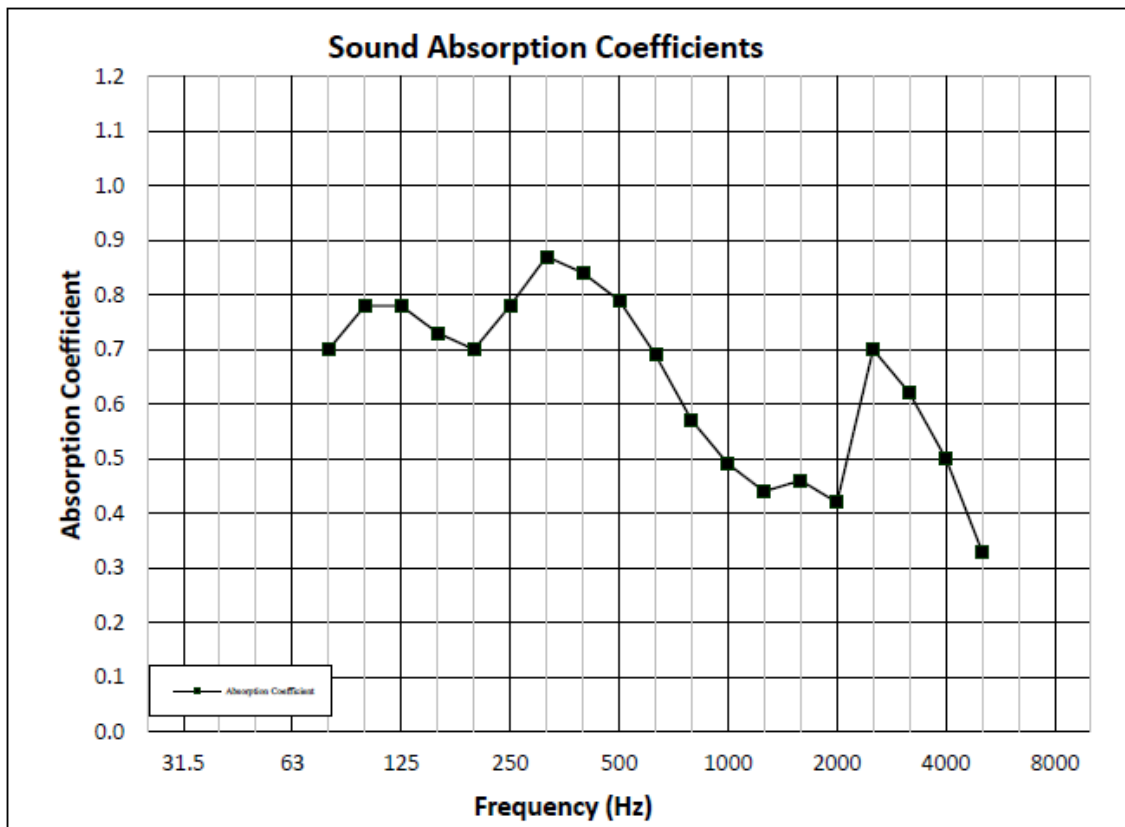
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ASTM C423 SOUND ABSORPTION TEST



| | | |
|---------------|--|------|
| TEST DATE | 05/20/20 | |
| DATA FILE NO. | K9724.01C | |
| CLIENT | 9Wood, Inc | |
| DESCRIPTION | Series/Model: Plain Planks With Duct Liner | |
| TECHNICIAN | Marco T Santa Rosa | |
| SPECIMEN AREA | 6.69 m ² | |
| MOUNTING TYPE | E400 | |
| | EMPTY | FULL |
| TEMP °C | 20.4 | 20.8 |
| RH % | 51 | 52 |
| B.P. (mb) | 1018 | 1018 |



TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 11

PHOTOGRAPHS



Photo No. 1
View of Test Specimen



Photo No. 2
Cross Section View of Test Specimen



Total Quality. Assured.

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TEST REPORT FOR 9 WOOD, INC.

Report No.: K9724.03-303-11-R0

Date: 06/17/20

SECTION 12

REVISION LOG

| REVISION # | DATE | PAGES | REVISION |
|------------|----------|-------|-----------------------|
| 0 | 06/17/20 | N/A | Original Report Issue |