

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-SA2734



Subject: Sound Absorption Test

Date: September 8, 2005

Contents: Sound Absorption Data, One-third Octave bands
Sound Absorption Coefficients, One-third Octave bands
Sound Absorption Average (SAA)
Noise Reduction Coefficient (NRC)

on

SonaKrete™/Sonacoustic™ on Solid Backing
Average Thickness - 3/4"
Type I Mount

for

International Cellulose Corporation

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INTRODUCTION

“The sound absorption coefficient is a property of the material composing the surface. It is ideally defined as the fraction of the randomly incident sound power absorbed by the surface.”

[ASTM C 423]

APPLICABLE STANDARDS

ASTM C 423 – 02a “Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method”

ASTM E 795 – 04 “Standard Practices for Mounting Test Specimens during Sound Absorption Tests”

TEST SPECIMEN

The test specimen consisted of composition acoustic material sprayed-on a solid backing whose overall dimensions were 2743 mm in width by 2438 mm in length by 35 mm in depth [108 by 96 by 1-3/8 inches]. The test specimen was designed, manufactured, submitted for test, and designated “SonaKrete™/Sonacoustic™ on Solid Backing - Average Thickness 3/4” ” by International Cellulose Corporation of Houston, Texas. The test specimen was provided in four (4) equal sections of the following plan dimensions: 1372 mm by 1219 mm [54 by 48 inches]. Each piece consisted of a base layer of 16 mm [5/8 inch] thick gypsum board onto which was applied a spray-on material with an average thickness of 19 mm [3/4 inch]. The spray-on material was applied at the manufacturers recommended rate. The test specimen was fully cured at the time of test.

Weight of the specimen was measured to be 98.1 kg [216.0 pounds]. The surface area of the specimen used in calculation of the sound absorption coefficients was calculated to be 6.6 square meters [70.6 square feet]. The test specimen was tested in a **Type I Mount*** in strict accordance with ASTM E 795-04 requirements. Edges were flashed with sheet metal flashings and sealed to the specimen with metal foil tape. Flashings were then sealed to the reverberation chamber floor with duct tape. Interior seams of the specimen were filled with excess cellulose of the same base material as the specimen.

**Note: The Type I Mount is a special case of the Type A Mount for Spray-on Applications*

DESCRIPTION OF TEST

The decay rate of sound [which is directly related to sound absorption] is measured upon terminating a steady-state broadband pink noise signal in the 255.6-m³ reverberation chamber. Four (4) ensemble averages containing thirty decays each are measured with both the test specimen inside of and removed from the chamber. These decays were averaged using a linear averaging algorithm and analyzed using ASTM C423-02a required methods to determine sound absorption present in the reverberation chamber. The difference between these two (2) sound absorption tests (with and without the test specimen) at a given frequency is defined as the sound absorption of the specimen. The Sound Absorption Coefficient is the sound absorption per unit area of the test specimen. Sound Absorption Average (SAA) is the average of sound absorption coefficients for twelve one-third-octave bands from 200 Hz through 2500 Hz inclusive. Noise Reduction Coefficient (NRC) is a four-frequency average of the Sound Absorption Coefficient. A rotating microphone boom and a Norsonic Nor-840 Dual Channel Real Time Analyzer, computer controlled using custom software, are used for all measurements. Measurements are made in the ISO-preferred one-third octave bands from 100 Hz to 5000 Hz. The test was conducted in strict accordance with ASTM C423 – 02a. A reverberation room qualification test report is available on request.

This test took place at **ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY**, Austin, TX, on August 30, 2005.

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SOUND ABSORPTION DATA

Measured Sound Absorption [in units of area] and Sound Absorption Coefficients of the test specimen at the preferred one-third octave band center frequencies are provided in the table below and then presented graphically on Page 4 of this report.

International Cellulose – SonaKrete™/Sonacoustic™ on Solid Backing - Average Thickness - 3/4"

| One-third Octave Band Center Freq. (Hz) | Sound Absorption (m ²) | Notes | Sound Absorption Coefficient | Repeatability* (+/-) | Reproducibility** (+/-) |
|--|------------------------------------|-------------|------------------------------|----------------------|-------------------------|
| 100 | 0.14 | | 0.02 | | |
| 125 | 1.66 | | 0.25 | 0.06 | 0.14 |
| 160 | 1.04 | | 0.16 | | |
| 200 | 1.80 | | 0.27 | | |
| 250 | 3.12 | | 0.48 | 0.05 | 0.18 |
| 315 | 3.91 | | 0.60 | | |
| 400 | 4.60 | | 0.70 | | |
| 500 | 5.28 | | 0.81 | 0.06 | 0.12 |
| 630 | 5.48 | | 0.84 | | |
| 800 | 5.44 | | 0.83 | | |
| 1000 | 5.60 | | 0.85 | 0.05 | 0.10 |
| 1250 | 5.45 | | 0.83 | | |
| 1600 | 5.55 | | 0.85 | | |
| 2000 | 5.57 | | 0.85 | 0.05 | 0.10 |
| 2500 | 5.59 | | 0.85 | | |
| 3150 | 5.85 | | 0.89 | | |
| 4000 | 6.17 | | 0.94 | 0.07 | 0.13 |
| 5000 | 6.17 | | 0.94 | | |
| Sound Absorption Average (SAA) | | 0.73 | | | |
| Noise Reduction Coefficient (NRC) | | 0.75 | | | |

Notes: [a] due to the very low absorption of the specimen tested, actual absorption values cannot be determined within repeatability values given. The result for this band should be considered inconclusive.

Repeatability** values represent estimates of absolute differences between two single test results within the same laboratory that are obtained on the same material under the same conditions in a Type A Mounting. Values are based on Round Robin testing. Repeatability values represent the probability of 95% that single tests lay within this range. *Reproducibility** values are estimates of absolute differences between two single test results between different laboratories that are obtained on the same material under the same conditions in a Type A Mounting. Values are based on Round Robin testing. Reproducibility values represent the probability of 95% that single tests between laboratories lay within this range.

Environmental conditions in the reverberation chamber were 24.1C and 68.4% relative humidity and remained within strict limits imposed by the laboratory.

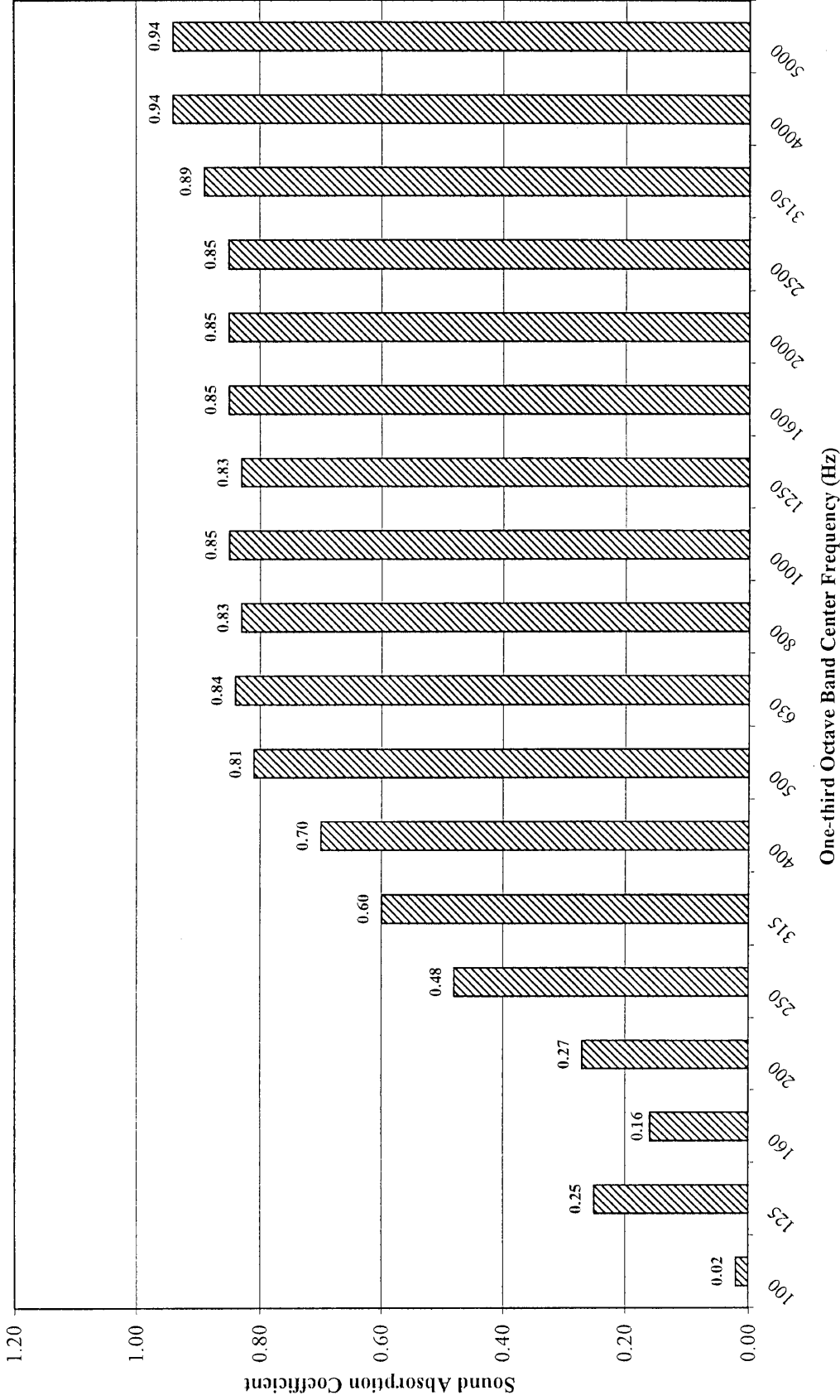
Respectfully Submitted,



Michael C. Black
Laboratory Technical Director

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International Cellulose SonaKrete™/Sonacoustic™ on 5/8" Gypsum - Average Thickness - 3/4"
Type I Mount AS-SA2734; SAA 0.73 NRC 0.75



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