ACOUSTIC SYSTEMS
Acoustical Research Facility

ACOUSTIC SYSTEMS
ACOUSTICAL RESEARCH FACILITY
OFFICIAL LABORATORY REPORT
AS-SA2520 Revision 1

Subject: **Sound Absorption Test**

Date: 05 May 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 Application Thickness – ¼"
Type I Mounting

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]

Note: *Revision 1 corrects an omission of a trademark symbol in Revision 0 for one (1) of the components of this test specimen. No data or results were changed from Revision 0. Revision 1 makes null and void Revision 0.*

APPLICABLE STANDARDS

ASTM C 423 – 02	"Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"
ASTM E 795 – 00	"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 2388 mm in length by 19 mm in depth *[108 by 94 by 3/4 inches]*. The test specimen was designed, manufactured, submitted for test, and designated " SonaKrete ™ / Sonacoustic™ on Solid Backing - Average Application Thickness 1/4" " by International Cellulose Corporation of Houston, TX. The test specimen was provided in four (4) sections of the following dimensions: two (2) sections with plan dimensions 1486 mm by 1194 mm *[58-1/2 by 47 inches]*; two (2) sections with plan dimensions 1257 mm by 1194 mm *[49-1/2 by 47 inches]*. Each piece consisted of a base layer of 13 mm *[1/2 inch]* thick gypsum board onto which was applied a spray-on material with an *average* thickness of 6 mm *[1/4 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 test specimen was 62.4 kg *[137.5 pounds]*, giving an average specimen density of 501.4 kg/m^3 *[31.3 pounds per cubic foot]*. The test specimen was tested in a **Type I Mount*** in strict accordance with ASTM E 795-00 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 254-m3 reverberation chamber. Five ensemble averages containing thirty-two 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 C423-02 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 NI-830 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 – 02 except where noted. This test took place at **ACOUSTIC SYSTEMS ACOUSTICAL RESEARCH FACILITY**, Austin, TX, on 28 December 2004.

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 4of this report.

International Cellulose Corporation - SonaKrete™ / Sonacoustic™ on Solid Backing
Average Application Thickness – ¼" -- Type I Mounting

1/3 Octave Band Center Freq. (Hz)	Sound Absorption (m^2)	Notes	Sound Absorption Coefficient	Repeatability* (+/-)	Reproducibility** (+/-)
100	0.35		0.05		
125	0.07		0.01	0.06	0.14
160	0.33		0.05		
200	0.20		0.03		
250	0.44		0.07	0.05	0.18
315	1.21		0.19		
400	1.78		0.27		
500	2.54		0.39	0.06	0.12
630	3.55		0.54		
800	4.27		0.65		
1000	4.55		0.69	0.05	0.10
1250	5.09		0.78		
1600	5.34		0.82		
2000	5.42		0.83	0.05	0.10
2500	5.62		0.86		
3150	5.74		0.88		
4000	5.71		0.87	0.07	0.13
5000	5.81		0.89		
Sound Absorption Average (SAA)		**0.51**			
Noise Reduction Coefficient (NRC)		**0.50**			

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 21.0C and 76.8% relative humidity and remained within strict limits imposed by the laboratory.

Respectfully Submitted,

Michael C. Black
Laboratory Technical Director

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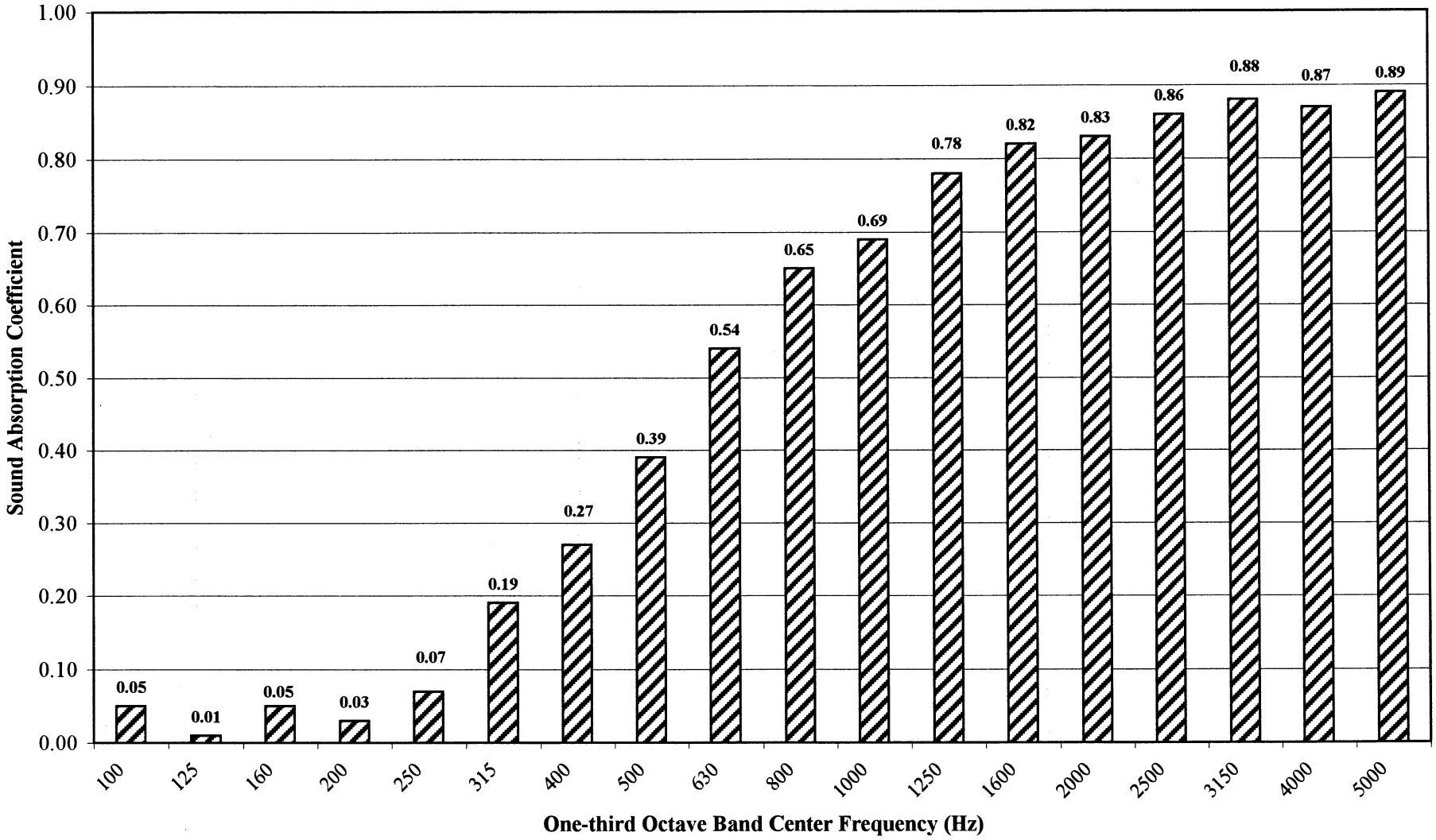
International Cellulose Corporation SonaKrete™/Sonacoustic™ on 1/2" Gypsum - 1/4" Application Thickness
Type I Mounting *AS-SA2520; SAA 0.51 NRC 0.50*



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