*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# SECTION 3

## ACOUSTIBLOK SOUND REDUCTION FLOOR/CEILING ASSEMBLIES ASSEMBLY DETAILS AND TEST REPORTS

- Acoustiblok Floor/Ceiling Test Overview
- Δ IIC14 – Acoustiblok 32oz. Sound Isolation Material, Tile Floor
- Δ IIC12 – Acoustiblok 16oz. Sound Isolation Material, Tile Floor
- Δ IIC23 / IIC50 – Acoustiblok 16oz. & Acoustiwool WF 0.125, Wood Floor
- IIC 67 / STC 74 - Acoustiblok 16oz. Sound Isolation Material, Tile Floor
- IIC 51 / STC 52 - Acoustiblok 16oz. Sound Isolation Material, Wood Floor
- IIC 50 / STC 52 - Acoustiblok 16oz. Sound Isolation Material, Tile Floor
- IIC 40 / STC 53 - Acoustiblok 32oz. Sound Isolation Material, Tile Floor
- IIC 38 / STC 54 - Acoustiblok 16oz. Sound Isolation Material, Tile Floor
- IIC 56 / STC 54 - Acoustiblok 16oz. & Acoustiwool WF0.125, Wood Floor
- IIC 51 / STC 55 - Acoustiblok 32oz. Sound Isolation Material, Wood Floor
- IIC 49 / STC 55 - Acoustiblok 16oz. Sound Isolation Material, Wood Floor

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# Acoustiblok® Sound Isolation Material: Floor/Ceiling Installation Test Index

| Test Report | Type | Rating | Floor/Ceiling Assembly Description |
|---|---|---|---|
| | | **Concrete Subfloor** | |
| NGC 7006007 | Delta Δ IIC / $L_{nw}$ | 14 | Tile, 32oz Acoustiblok, 6 in concrete slab - difference with/without Acoustiblok floor assembly<br>*No Ceiling Assembly Beneath The Slab, Ceiling Assemblies Typically Add 9-14 Points To The IIC Rating* |
| NGC 7006008 | Delta Δ IIC / $L_{nw}$ | 12 | Tile, 16oz Acoustiblok, 6 in concrete slab - difference with/without Acoustiblok floor assembly<br>*No Ceiling Assembly Beneath The Slab, Ceiling Assemblies Typically Add 9-14 Points To The IIC Rating* |
| 3102643-001a<br><br>3102643-001b | Floor IIC / $L_{nw}$<br><br>Delta Δ IIC / $L_{nw}$ | 50 / 60<br><br>23 | Tile, 16 oz Acoustiblok, Acoustiwool-TF0.11, on 6 in concrete slab **<br>*No Ceiling Assembly Beneath The Slab, Ceiling Assemblies Typically Add 9-14 Points To The IIC Rating*<br>** NOTE: Tile Council of North America rated this floor assembly "Residential" per the Robinson Floor Test (ASTM C627) Refer to Report # TCNA-308-06 in the Acoustiblok® material test section. |
| NGC 7006009<br><br>NGC 5006007 | Floor IIC / $L_{nw}$<br><br>Floor STC | 67 / 43<br><br>74 | 6 in concrete slab with quarry tile, 16oz Acoustiblok, suspended grid drywall ceiling |
| NGC 7006083<br><br>NGC 5006055 | Floor IIC / $L_{nw}$<br><br>Floor STC | 51 / 59<br><br>52 | Oak floor, Acoustiblok, Acoustiwool-WF0.125, on Hambro MD2000 Steel Floor Assembly |
| NGC 7006081<br><br>NGC 5006053 | Floor IIC / $L_{nw}$<br><br>Floor STC | 50 / 60<br><br>52 | Quarry tile, Acoustiblok, Acoustiwool-TF0.11, on Hambro MD2000 Steel Floor Assembly |
| NGC 7006004<br><br>NGC 5006004 | Floor IIC / $L_{nw}$<br><br>Floor STC | 40 / 70<br><br>53 | 6 in concrete slab with quarry tile and 32oz Acoustiblok<br>*No Ceiling Assembly Beneath The Slab, Ceiling Assemblies Typically Add 9-14 Points To The IIC Rating* |
| NGC 7006006<br><br>NGC 5006006 | Floor IIC / $L_{nw}$<br><br>Floor STC | 38 / 72<br><br>54 | 6 in concrete slab with quarry tile and 16oz Acoustiblok<br>*No Ceiling Assembly Beneath The Slab, Ceiling Assemblies Typically Add 9-14 Points To The IIC Rating* |
| | | **Wood Subfloor** | |
| 3107558-003<br><br>3107558-004 | Floor IIC / $L_{nw}$<br><br>Floor STC | 56 / 54<br><br>54 | Wood Floor,16oz Acoustiblok, Acoustiwool-WF0.125, Wood Joist, channel ceiling |
| NGC 7006002<br><br>NGC 5006002 | Floor IIC / $L_{nw}$<br><br>Floor STC | 51 / 59<br><br>55 | Oak floor on plywood substrate, 32oz Acoustiblok, OSB subfloor, channel ceiling |
| NGC 7006003<br><br>NGC 5006003 | Floor IIC / $L_{nw}$<br><br>Floor STC | 49 / 61<br><br>55 | Oak floor on plywood substrate, 16oz Acoustiblok, OSB subfloor, channel ceiling |

***Note: $L_{nw}$ ratings from calculation: $L_{nw} = 110 - (IIC)$. $R_w$ and STC ratings vary marginally using the equation $R_w = .98(STC) + 1.1$***

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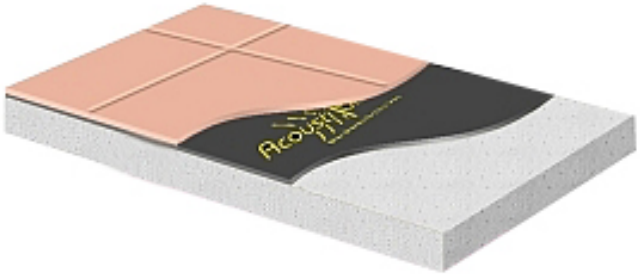
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# Impact Sound Improvement Of Tile Floor with Acoustiblok® 32 oz. on 6" Concrete Slab: Impact Insulation Δ +14dB Improvement Acoustical Test Overview

**Acoustiblok 32oz - 1/4" thick profile**
**+ 14dB Impact Insulation Improvement**



Controlling noise from the impact of hard objects on tile floors is a very difficult problem in construction.

IIC ratings on many products are from the addition of sound rated ceiling assemblies that used during testing. Sound rated ceiling assemblies will generally add a minimum of 9-14 point to the IIC rating of the floor assembly.

A new test protocol for concrete subfloors has been introduced under ASTM E2179. This test is conducted on 6" concrete slabs without a sound rated ceiling assembly installed. The only accurate method in comparing acoustic underlayment products is with independent ASTM E2179 test results.

This Acoustiblok IIC floor test conducted by NGC Testing Services on a 6" concrete slab floor consisted of: quarry tile, polymer modified mortar and grout, 32 oz Acoustiblok Sound Isolation Material achieved a +14dB improvement in the Impact Insulation Class (IIC) rating.

## Acoustiblok 32 oz. Tested to: ASTM E2179

Measurements of reduction in impact sound due to a floor covering treatment

Measurements of the effectiveness of floor coverings are made in accordance with *ASTM E2179, Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors*. This test is similar to ISO 140-8. Both measure the reduction in sound pressure level in the room below a concrete slab due to the installation of a floor covering of some kind. The reduction is used to calculate an improvement rating, DIIC, that can be used to compare floor covering products directly.

**EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS**

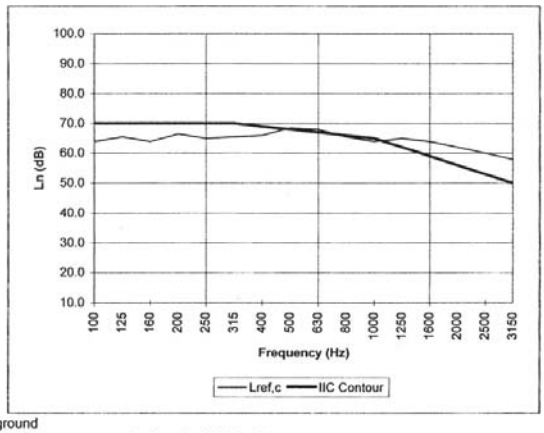
Test: ASTM E 2179 - 03

Page 6 of 6

Test Number: NGC7006007 Date: 1/13/2006

**Increase in Impact Insulation Class ΔIIC = 14.0**

| Frequency [Hz] | Lref,c [dB] |
|---|---|
| 100 | 64.0 |
| 125 | 65.5 |
| 160 | 64.0 |
| 200 | 66.5 |
| 250 | 65.0 |
| 315 | 65.5 |
| 400 | 66.0 |
| 500 | 68.5 |
| 630 | 68.0 |
| 800 | 65.5 |
| 1000 | 64.0 |
| 1250 | 65.0 |
| 1600 | 64.0 |
| 2000 | 62.0 |
| 2500 | 60.0 |
| 3150 | 58.0 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

Lref,c = Lref - Ld, dB
$L_n$ = Normalized Sound Pressure Level, dB

NGC Testing Services

# Acoustical Testing Laboratory

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# TEST REPORT

for

Acoustiblok, Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Myers / 813-980-1400

## Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors Test

**ASTM E 2179 – 03**
**On**

**6 Inch (152mm) Concrete Slab Floor-Ceiling Assembly with; Quarry Tile Flooring on 32 oz. Acoustiblok®**



Report Number: NGC 7006007

Assignment Number: G-287

Test Date: 01/13/2006

Report Date: 01/24/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director

Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors – Designation: E 2179 – 03

A 30 second averaging time was used for measurement of sound pressure levels.

Specimen Description: Quarry Tile Flooring over 32 oz. Acoustiblok® on 6 in. concrete floor-ceiling assembly.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 152mm x 152mm x 12.7mm (6 in. x 6 in. x ½ in.) unglazed clay quarry tile 27.3 kg/m$^2$ (5.6 PSF) installed using polymer modified mortar and polymer modified grout mixtures 4.9 kg/m$^2$ (1.0 PSF).
- 1 layer of 4.83mm (0.190 in.) Acoustiblok® ,black sound isolation material 9.18 kg/m$^2$ (1.88 PSF).
- 152mm (6 in.) thick reinforced concrete slab 366 kg/m$^2$ (75.0 PSF).

The overall weight of the test assembly is 407.5 kg/m$^2$ (83.48 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Test Floor Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Category II Specimen Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Conditioning: Mortar and grout cured for a minimum of 5 days. Concrete cured for a minimum of 28 days.

Test samples were submitted by client and tested as received.

Test Results: The results of the tests are given on pages 3 and 4.

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| Test: ASTM E 2179 - 03 | Bare 6" Concrete Slab |
|---|---|
| | Page 3 of 6 |
| Test Number: NGC7006007 | Date: 1/13/2006 |
| Size: 17.84 m² | |
| **Source room** | **Receiving room** |
| | Volume V = 45.24 m³ |
| Temperature [°C]: 19.4 | Temperature [°C]: 18.8 |
| Humidity [%]: 36 | Humidity [%]: 62 |

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 50 | 63.0 | 69.1 | 3.10 | -6.1 | -.- | 0.144 |
| 63 | 55.0 | 61.5 | 3.60 | -6.5 | -.- | 0.344 |
| 80 | 55.0 | 62.0 | 3.38 | -7.0 | -.- | 0.270 |
| 100 | 63.0 | 68.3 | 2.49 | -5.3 | -.- | 0.215 |
| 125 | 64.0 | 69.8 | 2.47 | -5.8 | -.- | 0.170 |
| 160 | 72.0 | 77.3 | 2.65 | -5.3 | -.- | 0.203 |
| 200 | 69.0 | 74.9 | 2.86 | -5.9 | -.- | 0.171 |
| 250 | 72.0 | 77.6 | 2.77 | -5.6 | -.- | 0.168 |
| 315 | 68.0 | 73.9 | 2.76 | -5.9 | -.- | 0.129 |
| 400 | 70.0 | 75.5 | 2.75 | -5.5 | -.- | 0.137 |
| 500 | 69.0 | 74.4 | 2.35 | -5.4 | -.- | 0.119 |
| 630 | 70.0 | 75.5 | 2.31 | -5.5 | -.- | 0.115 |
| 800 | 70.0 | 75.1 | 2.56 | -5.1 | -.- | 0.070 |
| 1000 | 71.0 | 76.8 | 2.53 | -5.8 | -.- | 0.055 |
| 1250 | 73.0 | 77.6 | 2.10 | -4.6 | -.- | 0.050 |
| 1600 | 73.0 | 77.2 | 1.95 | -4.2 | -.- | 0.045 |
| 2000 | 73.0 | 76.6 | 1.79 | -3.6 | 1.0 | 0.041 |
| 2500 | 74.0 | 77.1 | 1.60 | -3.1 | 5.0 | 0.037 |
| 3150 | 74.0 | 77.5 | 1.47 | -3.5 | 8.0 | 0.041 |
| 4000 | 77.0 | 79.4 | 1.28 | -2.4 | -.- | 0.037 |
| 5000 | 76.0 | 78.2 | 1.13 | -2.2 | -.- | 0.047 |

$L_n$ = Normalized Sound Pressure Level, dB
Sound Pressure Level Averaging Time = 30 sec.
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
$\Delta L_n$ = Uncertainty for 95% Confidence Level

The results reported above apply to specific samples submitted for measurement.
No responsibility is assumed for performance of any other specimen.
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The laboratory's accreditation or any of it's test reports in no way constitutes or implies product certification, approval, or endorsement by NVLAP or any agency of the U.S. Government.

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Test: ASTM E 2179 - 03 — 6" Concrete Slab with Specimen



Test Number: NGC7006007 — Date: 1/13/2006

Size: 17.84 m²

**Source room**

Temperature [°C]: 19.4

Humidity [%]: 36

**Receiving room**

Volume V = 45.24 m³

Temperature [°C]: 18.8

Humidity [%]: 62

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 50 | 57.0 | 63.2 | 3.07 | -6.2 | -.- | 0.151 |
| 63 | 55.0 | 60.6 | 2.67 | -5.6 | -.- | 0.276 |
| 80 | 56.0 | 62.3 | 2.75 | -6.3 | -.- | 0.256 |
| 100 | 60.0 | 66.4 | 2.92 | -6.4 | -.- | 0.199 |
| 125 | 62.0 | 67.7 | 2.62 | -5.7 | -.- | 0.174 |
| 160 | 68.0 | 73.9 | 2.88 | -5.9 | -.- | 0.343 |
| 200 | 67.0 | 72.9 | 2.96 | -5.9 | -.- | 0.151 |
| 250 | 68.0 | 74.2 | 2.75 | -6.2 | -.- | 0.159 |
| 315 | 64.0 | 70.1 | 3.00 | -6.1 | -.- | 0.129 |
| 400 | 66.0 | 72.2 | 2.88 | -6.2 | -.- | 0.139 |
| 500 | 67.0 | 72.8 | 2.57 | -5.8 | -.- | 0.101 |
| 630 | 67.0 | 72.6 | 2.41 | -5.6 | -.- | 0.090 |
| 800 | 64.0 | 70.0 | 2.62 | -6.0 | -.- | 0.070 |
| 1000 | 63.0 | 68.8 | 2.58 | -5.8 | -.- | 0.054 |
| 1250 | 66.0 | 70.2 | 2.14 | -4.2 | 1.9 | 0.041 |
| 1600 | 65.0 | 69.6 | 1.98 | -4.6 | 3.9 | 0.050 |
| 2000 | 63.0 | 67.0 | 1.79 | -4.0 | 4.9 | 0.035 |
| 2500 | 62.0 | 65.7 | 1.58 | -3.7 | 6.9 | 0.038 |
| 3150 | 60.0 | 63.4 | 1.44 | -3.4 | 7.9 | 0.044 |
| 4000 | 60.0 | 62.5 | 1.26 | -2.5 | -.- | 0.036 |
| 5000 | 57.0 | 58.6 | 1.12 | -1.6 | -.- | 0.050 |

$L_n$ = Normalized Sound Pressure Level, dB

Sound Pressure Level Averaging Time = 30 sec.

L2 = Receiving Room Level, dB

T = Reverberation Time, seconds

$\Delta L_n$ = Uncertainty for 95% Confidence Level



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## EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS

Test: ASTM E 2179 - 03



Test Number: NGC7006007 Date: 1/13/2006
Size: 10 m²

**Increase in Impact Insulation Class ΔIIC = 14.0**

| Frequency [Hz] | $L_o$ [dB] | $L_c$ [dB] | $L_d$ [dB] | $L_{ref}$ [dB] | $L_{ref,c}$ [dB] |
|---|---|---|---|---|---|
| 100 | 63.0 | 60.0 | 3.0 | 67.0 | 64.0 |
| 125 | 64.0 | 62.0 | 2.0 | 67.5 | 65.5 |
| 160 | 72.0 | 68.0 | 4.0 | 68.0 | 64.0 |
| 200 | 69.0 | 67.0 | 2.0 | 68.5 | 66.5 |
| 250 | 72.0 | 68.0 | 4.0 | 69.0 | 65.0 |
| 315 | 68.0 | 64.0 | 4.0 | 69.5 | 65.5 |
| 400 | 70.0 | 66.0 | 4.0 | 70.0 | 66.0 |
| 500 | 69.0 | 67.0 | 2.0 | 70.5 | 68.5 |
| 630 | 70.0 | 67.0 | 3.0 | 71.0 | 68.0 |
| 800 | 70.0 | 64.0 | 6.0 | 71.5 | 65.5 |
| 1000 | 71.0 | 63.0 | 8.0 | 72.0 | 64.0 |
| 1250 | 73.0 | 66.0 | 7.0 | 72.0 | 65.0 |
| 1600 | 73.0 | 65.0 | 8.0 | 72.0 | 64.0 |
| 2000 | 73.0 | 63.0 | 10.0 | 72.0 | 62.0 |
| 2500 | 74.0 | 62.0 | 12.0 | 72.0 | 60.0 |
| 3150 | 74.0 | 60.0 | 14.0 | 72.0 | 58.0 |

$L_o$ = Normalized Sound Pressure Level for Bare Standard Concrete Floor, dB
$L_c$ = Normalized Sound Pressure Level for Covering over Concrete Floor, dB
$L_d$ = $L_o$ - $L_c$, dB
Lref = Reference Floor Average Normalized Impact Sound Pressure Level, dB
Lref,c = Lref - Ld, dB

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## EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS

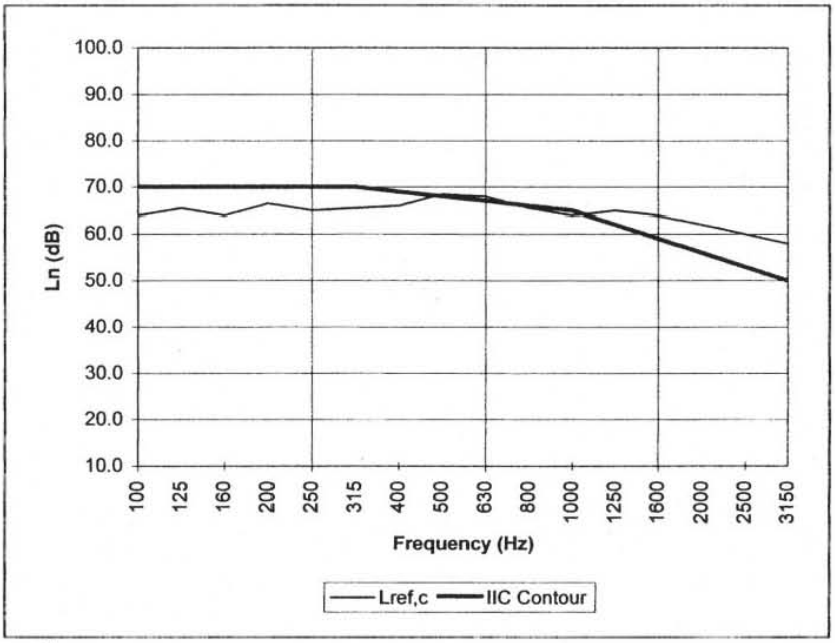
Test: ASTM E 2179 - 03



Test Number: NGC7006007 Date: 1/13/2006

**Increase in Impact Insulation Class ΔIIC = 14.0**

| Frequency [Hz] | Lref,c [dB] |
|---|---|
| 100 | 64.0 |
| 125 | 65.5 |
| 160 | 64.0 |
| 200 | 66.5 |
| 250 | 65.0 |
| 315 | 65.5 |
| 400 | 66.0 |
| 500 | 68.5 |
| 630 | 68.0 |
| 800 | 65.5 |
| 1000 | 64.0 |
| 1250 | 65.0 |
| 1600 | 64.0 |
| 2000 | 62.0 |
| 2500 | 60.0 |
| 3150 | 58.0 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

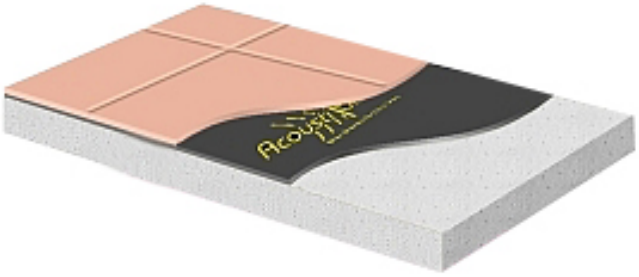
$L_{ref,c}$ = Lref - Ld, dB

$L_n$ = Normalized Sound Pressure Level, dB

*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# Impact Sound Improvement Of Tile Floor with Acoustiblok® 16 oz. on 6" Concrete Slab: Δ +12dB Improvement Acoustical Test Overview

**Acoustiblok 16oz - 1/8" thick profile**
**+ 12dB Impact Insulation Improvement**



Controlling noise from the impact of hard objects on tile floors is a very difficult problem in construction.

IIC ratings on many products are from the addition of sound rated ceiling assemblies that used during testing. Sound rated ceiling assemblies will generally add at least 9-14 point to the IIC rating of the floor assembly.

A new test protocol for concrete subfloors has been introduced under ASTM E2179. This test is conducted on 6" concrete slabs without a sound rated ceiling assembly installed. The only accurate method in comparing acoustic underlayment products is with independent ASTM E2179 test results.

This Acoustiblok IIC floor test conducted by NGC Testing Services on a 6" concrete slab floor consisted of: quarry tile, polymer modified mortar and grout, 16 oz. Acoustiblok Sound Isolation Material achieved a +12dB improvement in the Impact Insulation Class (IIC) rating.

## Acoustiblok 16 oz. Tested to: ASTM E2179

Measurements of reduction in impact sound due to a floor covering treatment

Measurements of the effectiveness of floor coverings are made in accordance with ASTM E2179, Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission through Concrete Floors. This test is similar to ISO 140-8. Both measure the reduction in sound pressure level in the room below a concrete slab due to the installation of a floor covering of some kind. The reduction is used to calculate an improvement rating, ΔIIC, that can be used to compare floor covering products directly.

**EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS**

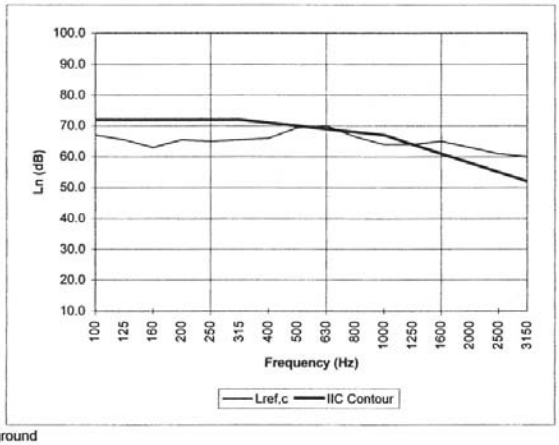
Test: ASTM E 2179 - 03

Page 6 of 6

Test Number: NGC7006008 Date: 1/23/2006

**Increase in Impact Insulation Class ΔIIC = 12.0**

| Frequency [Hz] | Lref,c [dB] |
|---|---|
| 100 | 67.0 |
| 125 | 65.5 |
| 160 | 63.0 |
| 200 | 65.5 |
| 250 | 65.0 |
| 315 | 65.5 |
| 400 | 66.0 |
| 500 | 69.5 |
| 630 | 70.0 |
| 800 | 66.5 |
| 1000 | 64.0 |
| 1250 | 64.0 |
| 1600 | 65.0 |
| 2000 | 63.0 |
| 2500 | 61.0 |
| 3150 | 60.0 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

Lref,c = Lref - Ld, dB
$L_n$ = Normalized Sound Pressure Level, dB

NGC Testing Services

# Acoustical Testing Laboratory

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# TEST REPORT

for

Acoustiblok, Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Myers / 813-980-1400

## Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors Test

**ASTM E 2179 – 03**
**On**

**6 Inch (152mm) Concrete Slab Floor-Ceiling Assembly with; Quarry Tile Flooring on 16 oz. Acoustiblok®**



Report Number: NGC 7006008

Assignment Number: G-287

Test Date: 01/23/2006

Report Date: 01/25/2006

Submitted by: Craig G. Cooper
Craig G. Cooper
Test Engineer

Reviewed by:
Robert J. Menchetti
Director

The results reported above apply to specific samples submitted for measurement.
No responsibility is assumed for performance of any other specimen.
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The laboratory's accreditation or any of it's test reports in no way constitutes or implies product certification, approval, or endorsement by NVLAP or any agency of the U.S. Government.

Report Number: NGC 7006008

Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors – Designation: E 2179 – 03

A 30 second averaging time was used for measurement of sound pressure levels.

Specimen Description: Quarry Tile Flooring over 32 oz. Acoustiblok® on 6 in. concrete floor-ceiling assembly.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 152mm x 152mm x 12.7mm (6 in. x 6 in. x ½ in.) unglazed clay quarry tile 27.3 kg/m$^2$ (5.6 PSF) installed using polymer modified mortar and polymer modified grout mixtures 4.9 kg/m$^2$ (1.0 PSF).
- 1 layer of 4.83mm (0.190 in.) Acoustiblok® ,black sound isolation material 9.18 kg/m$^2$ (1.88 PSF).
- 152mm (6 in.) thick reinforced concrete slab 366 kg/m$^2$ (75.0 PSF).

The overall weight of the test assembly is 407.5 kg/m$^2$ (83.48 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Test Floor Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Category II Specimen Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Conditioning: Mortar and grout cured for a minimum of 5 days. Concrete cured for a minimum of 28 days.

Test samples were submitted by client and tested as received.

Test Results: The results of the tests are given on pages 3 and 4.

NGC Testing Services

# Acoustical Testing Laboratory

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Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

Test: ASTM E 2179 - 03 — 6" Concrete Slab with Specimen



Test Number: NGC7006008 Date: 1/23/2006

Size: 17.84 m²

**Source room**

Temperature [°C]: 19.1

Humidity [%]: 35

**Receiving room**

Volume V = 45.24 m³

Temperature [°C]: 18.2

Humidity [%]: 65

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 50 | 62.0 | 69.4 | 4.36 | -7.4 | -.- | 0.389 |
| 63 | 54.0 | 59.8 | 2.52 | -5.8 | -.- | 0.144 |
| 80 | 55.0 | 60.3 | 2.44 | -5.3 | -.- | 0.363 |
| 100 | 63.0 | 69.5 | 2.98 | -6.5 | -.- | 0.189 |
| 125 | 62.0 | 67.2 | 2.59 | -5.2 | -.- | 0.150 |
| 160 | 67.0 | 73.3 | 2.94 | -6.3 | -.- | 0.279 |
| 200 | 66.0 | 71.9 | 3.05 | -5.9 | -.- | 0.165 |
| 250 | 68.0 | 73.9 | 2.79 | -5.9 | -.- | 0.118 |
| 315 | 64.0 | 70.6 | 3.05 | -6.6 | -.- | 0.119 |
| 400 | 66.0 | 72.5 | 2.94 | -6.5 | -.- | 0.107 |
| 500 | 68.0 | 73.3 | 2.56 | -5.3 | -.- | 0.101 |
| 630 | 69.0 | 73.7 | 2.41 | -4.7 | -.- | 0.104 |
| 800 | 65.0 | 70.8 | 2.61 | -5.8 | -.- | 0.076 |
| 1000 | 63.0 | 68.5 | 2.58 | -5.5 | -.- | 0.053 |
| 1250 | 65.0 | 69.7 | 2.17 | -4.7 | -.- | 0.039 |
| 1600 | 66.0 | 70.1 | 1.98 | -4.1 | 3.0 | 0.046 |
| 2000 | 64.0 | 68.1 | 1.81 | -4.1 | 4.0 | 0.034 |
| 2500 | 63.0 | 66.8 | 1.60 | -3.8 | 6.0 | 0.041 |
| 3150 | 62.0 | 64.8 | 1.47 | -2.8 | 8.0 | 0.044 |
| 4000 | 62.0 | 64.4 | 1.28 | -2.4 | -.- | 0.037 |
| 5000 | 59.0 | 61.2 | 1.14 | -2.2 | -.- | 0.039 |

$L_n$ = Normalized Sound Pressure Level, dB

Sound Pressure Level Averaging Time = 30 sec.

L2 = Receiving Room Level, dB

T = Reverberation Time, seconds

$\Delta L_n$ = Uncertainty for 95% Confidence Level



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Test: ASTM E 2179 - 03 — 6" Concrete Slab with Specimen



Test Number: NGC7006008 Date: 1/23/2006
Size: 17.84 m²

**Source room**

Temperature [°C]: 19.1
Humidity [%]: 35

**Receiving room**
Volume V = 45.24 m³
Temperature [°C]: 18.2
Humidity [%]: 65

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 50 | 62.0 | 69.4 | 4.36 | -7.4 | -.- | 0.389 |
| 63 | 54.0 | 59.8 | 2.52 | -5.8 | -.- | 0.144 |
| 80 | 55.0 | 60.3 | 2.44 | -5.3 | -.- | 0.363 |
| 100 | 63.0 | 69.5 | 2.98 | -6.5 | -.- | 0.189 |
| 125 | 62.0 | 67.2 | 2.59 | -5.2 | -.- | 0.150 |
| 160 | 67.0 | 73.3 | 2.94 | -6.3 | -.- | 0.279 |
| 200 | 66.0 | 71.9 | 3.05 | -5.9 | -.- | 0.165 |
| 250 | 68.0 | 73.9 | 2.79 | -5.9 | -.- | 0.118 |
| 315 | 64.0 | 70.6 | 3.05 | -6.6 | -.- | 0.119 |
| 400 | 66.0 | 72.5 | 2.94 | -6.5 | -.- | 0.107 |
| 500 | 68.0 | 73.3 | 2.56 | -5.3 | -.- | 0.101 |
| 630 | 69.0 | 73.7 | 2.41 | -4.7 | -.- | 0.104 |
| 800 | 65.0 | 70.8 | 2.61 | -5.8 | -.- | 0.076 |
| 1000 | 63.0 | 68.5 | 2.58 | -5.5 | -.- | 0.053 |
| 1250 | 65.0 | 69.7 | 2.17 | -4.7 | -.- | 0.039 |
| 1600 | 66.0 | 70.1 | 1.98 | -4.1 | 3.0 | 0.046 |
| 2000 | 64.0 | 68.1 | 1.81 | -4.1 | 4.0 | 0.034 |
| 2500 | 63.0 | 66.8 | 1.60 | -3.8 | 6.0 | 0.041 |
| 3150 | 62.0 | 64.8 | 1.47 | -2.8 | 8.0 | 0.044 |
| 4000 | 62.0 | 64.4 | 1.28 | -2.4 | -.- | 0.037 |
| 5000 | 59.0 | 61.2 | 1.14 | -2.2 | -.- | 0.039 |

$L_n$ = Normalized Sound Pressure Level, dB
Sound Pressure Level Averaging Time = 30 sec.
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
$\Delta L_n$ = Uncertainty for 95% Confidence Level



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## EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS

Test: ASTM E 2179 - 03



Test Number: NGC7006008 Date: 1/23/2006

Size: 10 m²

**Increase in Impact Insulation Class ΔIIC = 12.0**

| Frequency [Hz] | $L_o$ [dB] | $L_c$ [dB] | $L_d$ [dB] | $L_{ref}$ [dB] | $L_{ref,c}$ [dB] |
|---|---|---|---|---|---|
| 100 | 63.0 | 63.0 | 0.0 | 67.0 | 67.0 |
| 125 | 64.0 | 62.0 | 2.0 | 67.5 | 65.5 |
| 160 | 72.0 | 67.0 | 5.0 | 68.0 | 63.0 |
| 200 | 69.0 | 66.0 | 3.0 | 68.5 | 65.5 |
| 250 | 72.0 | 68.0 | 4.0 | 69.0 | 65.0 |
| 315 | 68.0 | 64.0 | 4.0 | 69.5 | 65.5 |
| 400 | 70.0 | 66.0 | 4.0 | 70.0 | 66.0 |
| 500 | 69.0 | 68.0 | 1.0 | 70.5 | 69.5 |
| 630 | 70.0 | 69.0 | 1.0 | 71.0 | 70.0 |
| 800 | 70.0 | 65.0 | 5.0 | 71.5 | 66.5 |
| 1000 | 71.0 | 63.0 | 8.0 | 72.0 | 64.0 |
| 1250 | 73.0 | 65.0 | 8.0 | 72.0 | 64.0 |
| 1600 | 73.0 | 66.0 | 7.0 | 72.0 | 65.0 |
| 2000 | 73.0 | 64.0 | 9.0 | 72.0 | 63.0 |
| 2500 | 74.0 | 63.0 | 11.0 | 72.0 | 61.0 |
| 3150 | 74.0 | 62.0 | 12.0 | 72.0 | 60.0 |

$L_o$ = Normalized Sound Pressure Level for Bare Standard Concrete Floor, dB

$L_c$ = Normalized Sound Pressure Level for Covering over Concrete Floor, dB

$L_d$ = $L_o$ - $L_c$, dB

Lref = Reference Floor Average Normalized Impact Sound Pressure Level, dB

Lref,c = Lref - Ld, dB



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## EFFECTIVENESS OF FLOOR COVERINGS IN REDUCING IMPACT SOUND TRANSMISSION THROUGH CONCRETE FLOORS

Test: ASTM E 2179 - 03

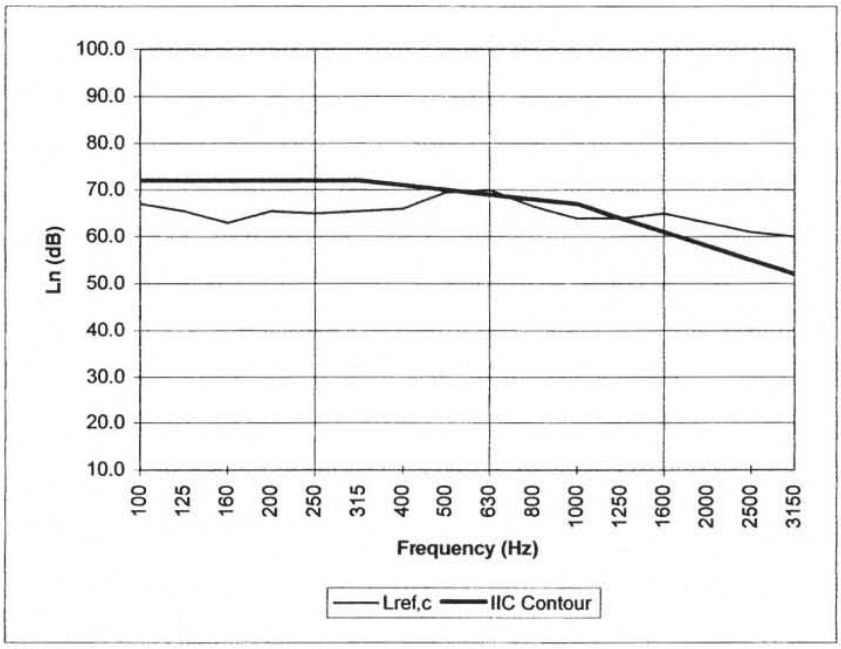


Test Number: NGC7006008

Date: 1/23/2006

**Increase in Impact Insulation Class ΔIIC = 12.0**

| Frequency [Hz] | Lref,c [dB] |
|---|---|
| 100 | 67.0 |
| 125 | 65.5 |
| 160 | 63.0 |
| 200 | 65.5 |
| 250 | 65.0 |
| 315 | 65.5 |
| 400 | 66.0 |
| 500 | 69.5 |
| 630 | 70.0 |
| 800 | 66.5 |
| 1000 | 64.0 |
| 1250 | 64.0 |
| 1600 | 65.0 |
| 2000 | 63.0 |
| 2500 | 61.0 |
| 3150 | 60.0 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

Lref,c = Lref - Ld, dB

$L_n$ = Normalized Sound Pressure Level, dB



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*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# Tile Floor Acoustic Improvement with Acoustiblok® 16 oz. and Acoustiwool™-TF0.11 on Concrete Slab: IIC50 and Delta +23dB Ratings Acoustical Test Overview


Controlling noise from the impact of hard objects on tile floors is a very difficult problem in construction. Acoustiblok provides an economical and "low profile" solution.

The concrete slab floor/ceiling assembly depicted at left, Saltillo tile with thin set mortar, over 16 oz Acoustiblok sound barrier material and an Acoustiwool isolation layer, was tested by Intertek / ETL SEMKO and found to have an impact insulation class (IIC) of 50. This exceeds typical specification for impact sound control in floor/ceiling construction.

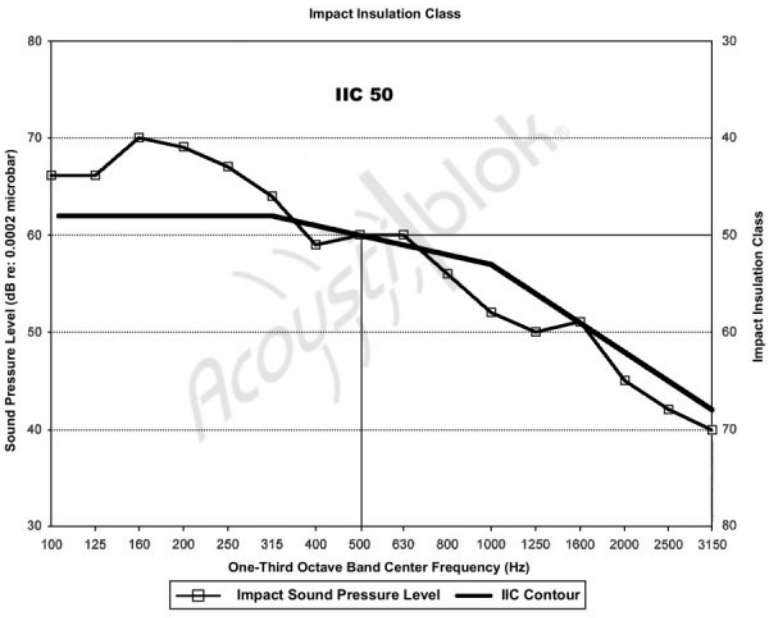
The 6" concrete slab, without tile and Acoustiblok, was found to have an IIC of only 28 which does not meet typical specifications for impact sound isolation in floor/ceiling construction. Our simple acoustical treatment added 23 dB of impact sound insulation.

**Impact Insulation Class** (IIC) is a single number rating used to compare the performance of floor/ceiling assemblies in blocking impact noise, such as footsteps and dropped objects. The higher the IIC rating number, the better the performance. An IIC of 50 is the required minimum rating for preventing noise complaints in residential building. IIC ratings are calculated by a method similar to STC ratings

The IIC of a particular floor assembly is derived using a standard tapping machine, as stipulated in ASTM method E492.3 This machine incorporates five steel-faced hammers that strike the test floor and generate noise in a room below. The noise levels are measured and used to calculate the impact insulation class (IIC), following ASTM method E989.

Report No. 3102643CRT-001a

**SALTILLO TILE/ ACOUSTIBLOK® SYSTEM OVER 6" CONCRETE SLAB**



SINCE 1896

# REPORT

Intertek ETL SEMKO

3933 US ROUTE 11 CORTLAND, NEW YORK13045

Order No. 3102643 Date: September 25, 2006

## REPORT NO. 3102643CRT-001a

## IMPACT SOUND TRANSMISSION TEST AND CLASSIFICATION OF FLOORING PRODUCTS ON A SIX INCH CONCRETE SLAB

## RENDERED TO

**ACOUSTIBLOK®, INC.**
**6900 INTERBAY BLVD.**
**TAMPA, FL 33616**

## INTRODUCTION

This report gives the results of an Impact Sound Transmission test and the determination of the Impact Insulation Class of a tile/underlayment flooring system over a six inch concrete slab. The tiles and mortar were supplied and installed by Intertek. The underlayment materials were selected and supplied by the client and received at the laboratories on August 21, 2006. The sample appeared to be in a new, unused condition.

## AUTHORIZATION

Signed quote no. 313350r-1.

## TEST METHOD

The specimen was tested in accordance with the American Society for Testing and Materials designation ASTM E492-04, "Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine". It was classified in accordance with ASTM E989-89 (Re-approved 1999), entitled, "Standard Classification for Determination of Impact Insulation Class (IIC)".

## GENERAL

The method is designed to measure the impact sound transmission performance of a floor-ceiling assembly, in a controlled laboratory environment. A standard tapping machine (B & K Type 3207) was placed at four positions on a test floor that forms the horizontal separation between two rooms, one directly above the other. The data obtained was normalized to a reference room absorption of 10 square meters in accordance with the test method.

The standard also prescribes a single-figure classification rating called "Impact Insulation Class, IIC" which can be used by architects, builders and code authorities for acoustical design purposes in building construction.

The IIC is obtained by matching a standard reference contour to the plotted normalized one-third octave band sound pressure levels at each test frequency. The greater the IIC rating, the lower the impact sound transmission through the floor-ceiling assembly

## DESCRIPTION OF THE FLOOR/CEILING ASSEMBLY AND TEST SPECIMEN

The floor system consisted of a six inch thick concrete slab that forms the horizontal separation between two rooms. The slab is not isolated from the receiving room walls.

The test specimen consisted of 11 ½ inch square Saltillo Tiles (5 pounds per square foot) installed over Acoustiblok® (3/32 inch thick vinyl mat) which was installed over Acoustiwool (1/8 inch thick fiber matting) in accordance with the manufacturer's instructions. The tiles were installed using Laticrete® 317 Thin Set Mortar with Laticrete® 333 Thin Set Additive.

## RESULTS OF TEST

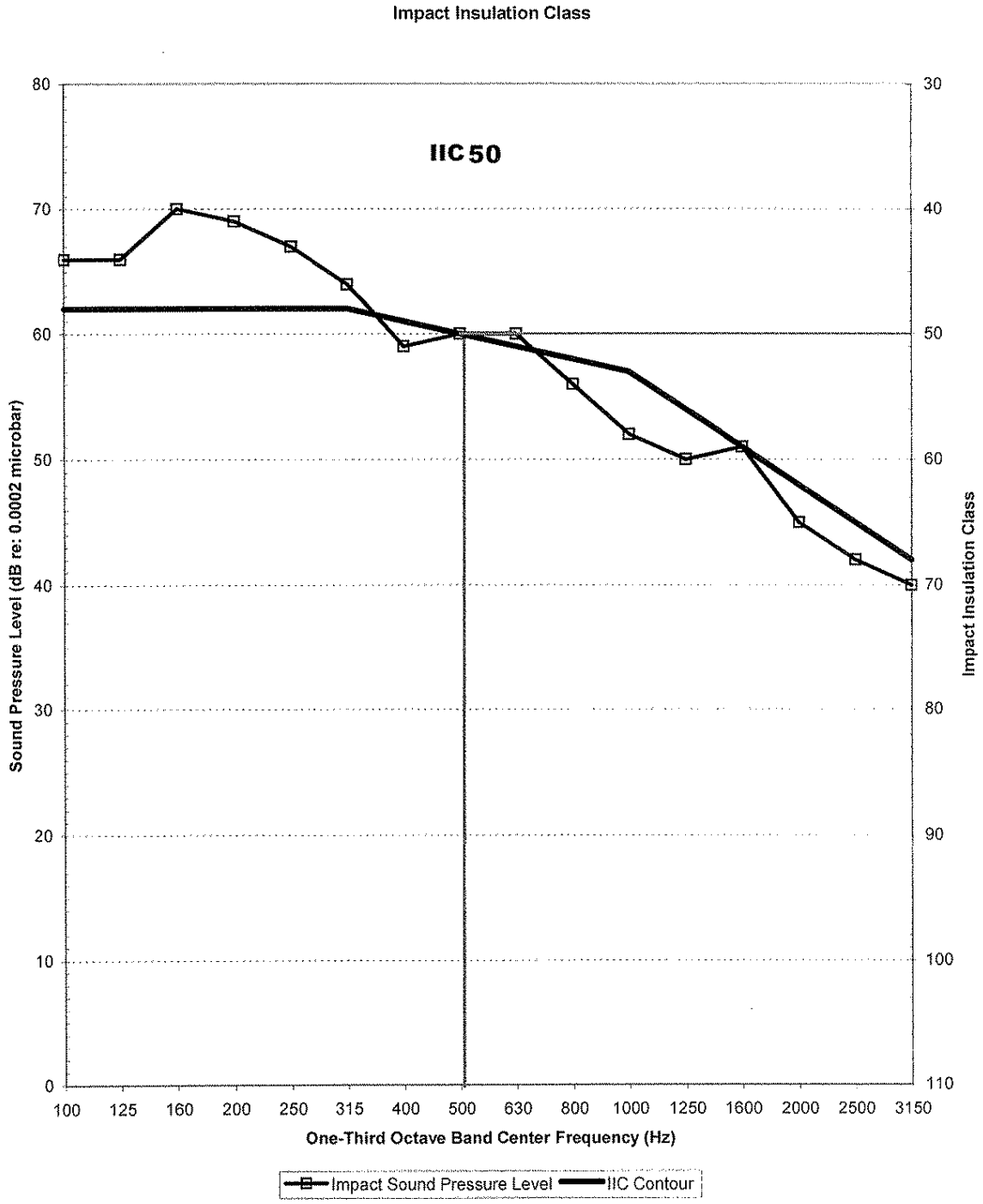
The data obtained in the room below the panel normalized to $A_o$ = 10 square meters, is as follows:

| 1/3 Octave Band Center Frequency Hz | 1/3 Octave Band Sound Pressure Level dB re 0.0002 Microbar |
|---|---|
| 100 | 66 |
| 125 | 66 |
| 160 | 70 |
| 200 | 69 |
| 250 | 67 |
| 315 | 64 |
| 400 | 59 |
| 500 | 60 |
| 630 | 60 |
| 800 | 56 |
| 1000 | 52 |
| 1250 | 50 |
| 1600 | 51 |
| 2000 | 45 |
| 2500 | 42 |
| 3150 | 40 |
| Impact Insulation Class (IIC) | 50 |

The 95% uncertainty level for each tapping machine location is less than 3 dB for the 1/3 octave bands centered in the range from 100 to 400 Hz and less than 2.5 dB for the bands centered in the range from 500 to 3150 Hz.

For the floor/ceiling construction, the 95% uncertainty limits ($\Delta L_n$) for the normalized sound pressure levels were determined to be less than 2 dB for the 1/3 octave bands centered in the range from 100 to 3500.

## SALTILLO TILE/ ACOUSTIBLOK® SYSTEM OVER 6" CONCRETE SLAB




Checked by: q K

Intertek ETL SEMKO

**REMARKS**

1. Aging Period: 48 hours
2. Ambient Temperature: 68°F
3. Relative Humidity: 39%

**CONCLUSION**

The test method employed for this test has no pass-fail criteria, therefore, the evaluation of the test results is left to the discretion of the client.

Date of Test: September 22, 2006

Report Approved by:

James H. Nickelsen
Senior Project Engineer
Acoustical Testing

Report Reviewed By:

James R. Kline
Engineer/Quality Supervisor
Acoustical Testing

Attachments: None

SINCE 1896

# REPORT

Intertek ETL SEMKO

3933 US ROUTE 11 CORTLAND, NEW YORK13045

Order No. 3102643 Date: September 25, 2006

**REPORT NO. 3102643CRT-001b**

**IMPACT SOUND TRANSMISSION TESTS AND CLASSIFICATION OF FLOORING PRODUCTS ON A SIX INCH CONCRETE SLAB**

**RENDERED TO**

**ACOUSTIBLOK®, INC.**
**6900 INTERBAY BLVD.**
**TAMPA, FL 33616**

## INTRODUCTION

This report gives the results of Impact Sound Transmission tests and the determination of the Impact Insulation Class of a tile/underlayment flooring system over a six inch concrete slab. The tiles and mortar were supplied and installed by Intertek. The underlayment materials were selected and supplied by the client and received at the laboratories on August 21, 2006. The sample appeared to be in a new, unused condition.

## AUTHORIZATION

Signed quote no. 313350r-1.

## TEST METHOD

The specimen was tested in general accordance with the American Society for Testing and Materials designation ASTM E2179-03, "Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors".

**TEST METHOD** – Cont'd

Two vertically adjacent rooms are used: the upper one being designated the source room and the lower one the receiving room (10,000 $ft^3$). A standard concrete floor is installed in an opening between them. The rooms and the floor installation are designed so the only significant sound radiation into the receiving room is from the standard concrete floor.

A standard tapping machine is placed and activated on the standard concrete floor and the impact sound pressure levels are measured in the room below. The floor covering to be evaluated is then placed on the standard concrete floor and the impact sound pressure levels measured again.

The differences in impact sound pressure level are used to calculate two single number ratings. The first is an IIC rating calculated for the covering installed on the reference concrete floor. The second rating, ΔIIC, represents the calculated reduction in IIC when the covering is placed on the reference concrete floor, that is the improvement in IIC due to the covering.

## DESCRIPTION OF THE FLOOR/CEILING ASSEMBLY AND TEST SPECIMEN

The floor system consisted of a six inch thick concrete slab that forms the horizontal separation between two rooms. The slab is not isolated from the receiving room walls.

The test specimen consisted of 11 ½ inch square Saltillo Tiles (5 pounds per square foot) installed over Acoustiblok® (3/32 inch thick vinyl mat) which was installed over Acoustiwool (1/8 inch thick fiber matting) in accordance with the manufacturer's instructions. The tiles were installed using Laticrete® 317 Thin Set Mortar with Laticrete® 333 Thin Set Additive.

## RESULTS OF TESTS

The data obtained in the room below the panel normalized to $A_o$ = 10 square meters, is as follows:

| 1/3 Octave Band Center Frequency Hz | 1/3 Octave Band Sound Pressure Level dB re 0.0002 Microbar | | | | |
|---|---|---|---|---|---|
| | Bare Concrete | Test Specimen on Concrete | Difference in dB | Reference Floor | Calculated Levels |
| 100 | 63.8 | 61.6 | 2.2 | 67.0 | 64.8 |
| 125 | 64.5 | 64.2 | 0.3 | 67.5 | 67.2 |
| 160 | 67.5 | 67.5 | 0 | 68.0 | 68.0 |
| 200 | 68.5 | 67.0 | 1.5 | 68.5 | 67.0 |
| 250 | 69.4 | 65.5 | 3.9 | 69.0 | 65.1 |
| 315 | 70.7 | 62.4 | 8.3 | 69.5 | 61.2 |
| 400 | 71.4 | 58.2 | 13.2 | 70.0 | 56.8 |
| 500 | 71.9 | 58.2 | 13.7 | 70.5 | 56.8 |
| 630 | 72.9 | 58.9 | 14.0 | 71.0 | 57.0 |
| 800 | 74.1 | 55.0 | 19.1 | 71.5 | 52.4 |
| 1000 | 74.5 | 50.2 | 24.3 | 72.0 | 47.7 |
| 1250 | 76.2 | 47.7 | 28.5 | 72.0 | 43.5 |
| 1600 | 78.0 | 48.7 | 29.3 | 72.0 | 42.7 |
| 2000 | 79.6 | 42.1 | 37.5 | 72.0 | 34.5 |
| 2500 | 79.5 | 39.6 | 39.9 | 72.0 | 32.1 |
| 3150 | 79.3 | 36.2 | 43.1 | 72.0 | 28.9 |
| Impact Insulation Class (IIC) | | | | 28 | 51 |

Calculated improvement in Impact Insulation Class: IIC 51– IIC 28 = ΔIIC 23

*Classified in accordance with ASTM E989-89 (Re-approved 1999), entitled, "Standard Classification for Determination of Impact Insulation Class (IIC)".

The uncertainty limit of the impact noise test data is less than 3 dB for the 1/3 octave bands centered in the range from 100 to 400 Hz and less than 2.5 dB for the bands centered on the range from 500 to 3150 Hz.

## REMARKS

1. Aging Period: 48 hours
2. Ambient Temperature: 68°F
3. Relative Humidity: 39%

## CONCLUSION

The test method employed for this test has no pass-fail criteria, therefore, the evaluation of the test results is left to the discretion of the client.

Date of Tests: September 22, 2006

Report Approved by:

James H. Nickelsen
Senior Project Engineer
Acoustical Testing

Report Reviewed By:

James R. Kline
Engineer/Quality Supervisor
Acoustical Testing

Attachments: None

*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

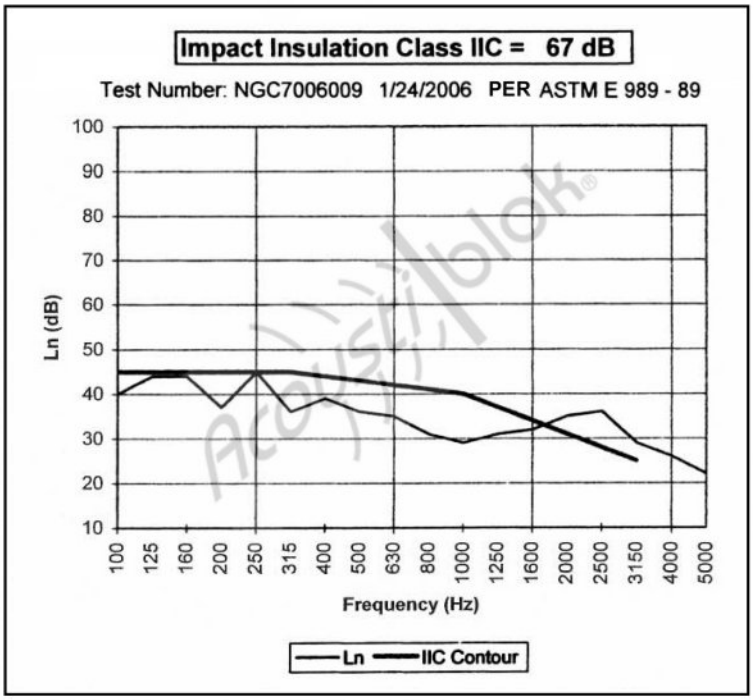
# Acoustiblok® 16 oz, Tile Floor, Concrete Slab, and Suspended Ceiling: IIC67 and STC74 Rated Acoustical Test Overview


NGC Testing Services rates this floor configuration with an IIC (impact insulation class) of 67 dB, and an STC (sound transmission class) of 74. See report graphs below, showing the performance of this configuration relative to noise source frequencies.

The tested assembly: 1/2" unglazed quarry tile with polymer modified mortar & grout & 16 oz Acoustiblok on 6" reinforced concrete slab, with 5/8" type X gypsum board drop ceiling and 3" fiberglass insulation.

**Impact Insulation Class** (IIC) is a single number rating used to compare the performance of floor/ceiling partitions in blocking impact noise, such as footsteps and dropped objects. The higher the IIC rating number, the better the performance. An IIC of 50 is usually considered the minimum for preventing noise complaints in residential building. IIC ratings are calculated by a method similar to STC ratings (see description of STC below).

The IIC of a particular floor assembly is derived using a standard tapping machine, as stipulated in ASTM method E492.3 This machine incorporates five steel-faced hammers that strike the test floor and generate noise in a room below. The noise levels are measured and used to calculate the impact insulation class (IIC), following ASTM method E989.



*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
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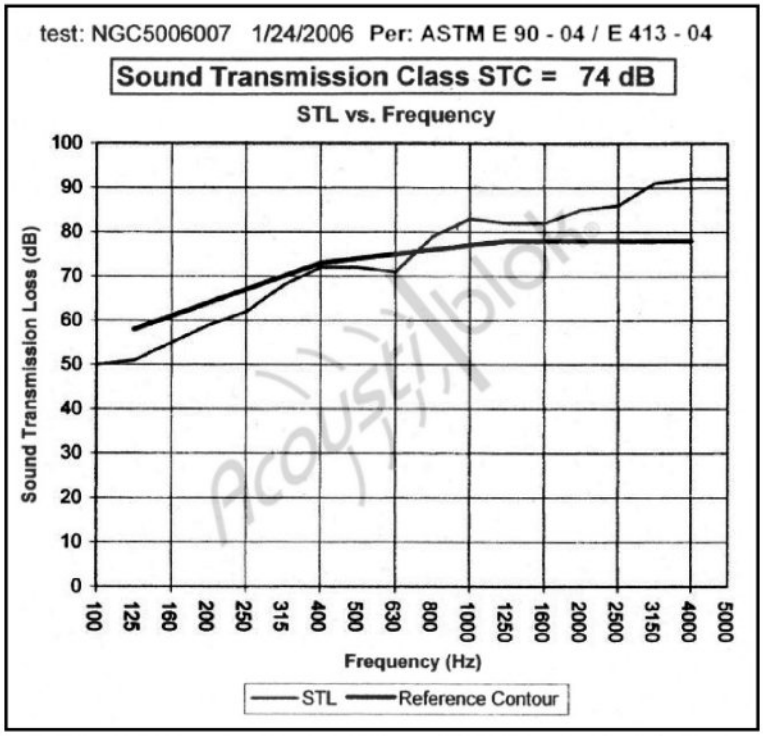
# Acoustiblok® 16 oz, Tile Floor, Concrete Slab, and Suspended Ceiling: IIC67 and STC74 Rated Acoustical Test Overview




Sound Transmission Loss data for 6" reinforced concrete slab floor with quarry tile, 16 oz Acoustiblok, and gypsum board drop ceiling, STC 74 rated.

**SOUND TRANSMISSION CLASS** is a single number that represents the sound blocking capacity of a partition such as a wall or ceiling.

STC numbers are often called out in architectural specifications, to assure that partitions will reduce noise levels. For performance similar to laboratory test numbers, it is necessary to adhere closely to the construction materials and techniques used in the tested partition.

STC calculations emphasize sound frequencies that match the human voice. A high STC partition will block the sound of human speech, and block noise that interferes with human speech. A high STC number may not indicate a partition that is effective in blocking very low or very high pitched sound. STC measures sound blocking for airborne noise source only; it does not indicate how well a partition can block impact noise (objects striking the far side of the partition), or directly transmitted noise such as machinery mounted on the far side of the wall.

STC is calculated by comparing the actual sound loss measured when 18 test frequencies pass through a partition, with fixed values for each STC level. The highest STC curve that the measured sound loss numbers fit under, determines the STC rating of the tested partition.

NGC Testing Services

# Acoustical Testing Laboratory

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Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

# TEST REPORT

for

Acoustiblok, Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Myers / 813-980-1400

## Impact Sound Transmission Test

**ASTM E 492 – 04 / ASTM E 989 – 89**
**On**

**6 in. (152 mm) Concrete Slab Floor-Ceiling Assembly with Suspended Gypsum Board Ceiling Overlaid with; Quarry Tile Flooring on 16 oz. Acoustiblok®**



Report Number: NGC 7006009

Assignment Number: G-287

Test Date: 01/24/2006

Report Date: 01/25/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director

Report Number: NGC 7006009

Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine - Designation: E 492 – 04.

The uncertainty limits of each tapping machine location met the precision requirements of section 11.3 of ASTM E 492-04.

Specimen Description: Quarry Tile Flooring over 16 oz. Acoustiblok® on 6 in. concrete floor-ceiling assembly with suspended 5/8 in. gypsum board ceiling.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 152mm x 152mm x 12.7mm (6 in. x 6 in. x ½ in.) unglazed clay quarry tile 27.3 kg/m$^2$ (5.6 PSF) installed using polymer modified mortar and polymer modified grout mixtures 4.9 kg/m$^2$ (1.0 PSF).
- 1 layer of 2.46mm (0.097 in.) Acoustiblok® ,black sound isolation material 4.88 kg/m$^2$ (1.0 PSF).
- 152mm (6 in.) thick reinforced concrete slab 366 kg/m$^2$ (75.0 PSF).
- Drywall grid suspension system consisting of 15.9mm (5/8 in.) type X gypsum board 11.2 kg/m$^2$ (2.3 PSF) attached with 28.6mm (1-1/8in.) screws, 305mm (12 in.) o.c. to suspended grid suspension system. 305mm (12 in.) plenum with 89mm (3-1/2 in.) lay-in fiberglass insulation 0.78 kg/m$^2$ (0.16 PSF).

The overall weight of the test assembly is 415.3 kg/m$^2$ (85.1 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Test Floor Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Conditioning: Mortar and grout cured for a minimum of 5 days. Concrete cured for a minimum of 28 days.

Test samples were submitted by client and tested as received.

Test Results: The results of the tests are given on pages 3 and 4.

Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

## Normalized impact sound pressure level

Test: ASTM E 492 - 04 / ASTM E 989 - 89



Test Number: NGC7006009 Date: 1/24/2006
Size: 17.84 m²

| Source room | Receiving room |
|---|---|
| | Volume V = 40.0 m³ |
| Temperature [°C]: 19.1 | Temperature [°C]: 18.9 |
| Humidity [%]: 34 | Humidity [%]: 63 |

### Impact Insulation Class IIC = 67 dB

Sum of unfavorable deviations: 16.0 dB
Max. unfavorable deviation: 8.0 dB at 2500 Hz

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 100 | 40.0 | 45.9 | 2.65 | -5.9 | -.- | 0.299 |
| 125 | 44.0 | 51.0 | 2.93 | -7.0 | -.- | 0.263 |
| 160 | 44.0 | 51.0 | 3.35 | -7.0 | -.- | 0.373 |
| 200 | 37.0 | 44.2 | 3.30 | -7.2 | -.- | 0.182 |
| 250 | 45.0 | 52.1 | 3.48 | -7.1 | -.- | 0.210 |
| 315 | 36.0 | 42.7 | 3.20 | -6.7 | -.- | 0.143 |
| 400 | 39.0 | 45.8 | 3.03 | -6.8 | -.- | 0.089 |
| 500 | 36.0 | 42.2 | 2.71 | -6.2 | -.- | 0.114 |
| 630 | 35.0 | 41.4 | 2.67 | -6.4 | -.- | 0.106 |
| 800 | 31.0 | 37.2 | 2.74 | -6.2 | -.- | 0.089 |
| 1000 | 29.0 | 34.9 | 2.65 | -5.9 | -.- | 0.063 |
| 1250 | 31.0 | 36.4 | 2.38 | -5.4 | -.- | 0.044 |
| 1600 | 32.0 | 37.1 | 2.18 | -5.1 | -.- | 0.038 |
| 2000 | 35.0 | 39.1 | 1.86 | -4.1 | 4.0 | 0.040 |
| 2500 | 36.0 | 39.9 | 1.67 | -3.9 | 8.0 | 0.039 |
| 3150 | 29.0 | 33.0 | 1.58 | -4.0 | 4.0 | 0.045 |
| 4000 | 26.0 | 29.3 | 1.42 | -3.3 | -.- | 0.034 |
| 5000 | 22.0 | 25.0 | 1.27 | -3.0 | -.- | 0.038 |

$L_n$ = Normalized Sound Pressure Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
$\Delta L_n$ = Uncertainty for 95% Confidence Level

## Normalized impact sound pressure level

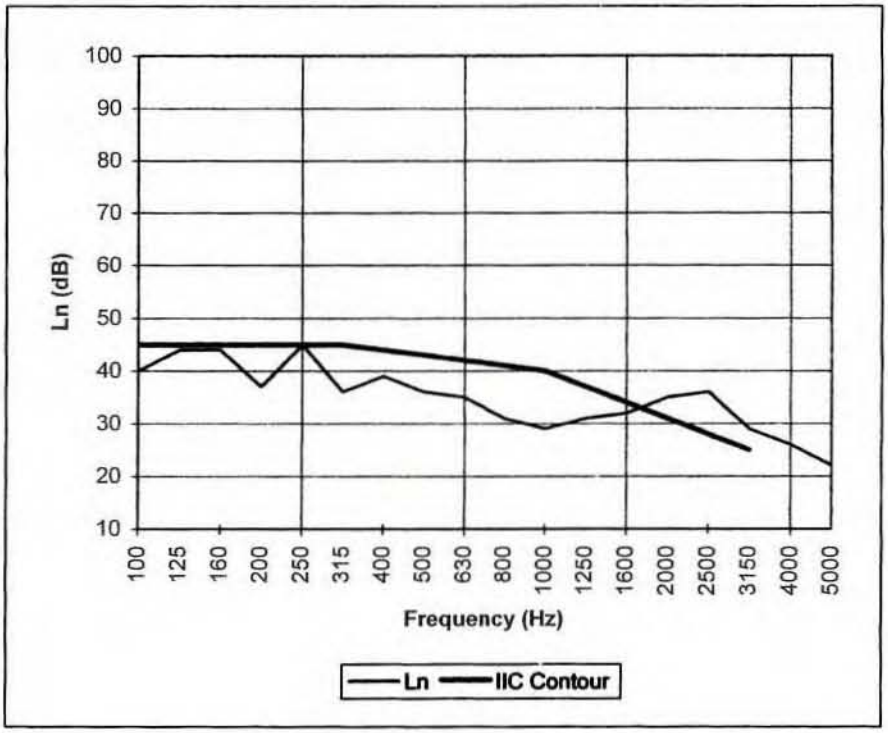
Test: ASTM E 492 - 04 / ASTM E 989 - 89



Test Number: NGC7006009 Date: 1/24/2006

**Impact Insulation Class IIC = 67 dB**

| Frequency [Hz] | $L_n$ [dB] | |
|---|---|---|
| 100 | 40 | |
| 125 | 44 | * |
| 160 | 44 | |
| 200 | 37 | |
| 250 | 45 | |
| 315 | 36 | |
| 400 | 39 | |
| 500 | 36 | |
| 630 | 35 | * |
| 800 | 31 | |
| 1000 | 29 | |
| 1250 | 31 | |
| 1600 | 32 | |
| 2000 | 35 | |
| 2500 | 36 | |
| 3150 | 29 | |
| 4000 | 26 | |
| 5000 | 22 | |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

$L_n$ = Normalized Sound Pressure Level, dB

NGC Testing Services

# Acoustical Testing Laboratory

# TEST REPORT

for

Acoustiblok, Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Myers / 813-980-1400

## Sound Transmission Loss Test

**ASTM E 90 – 04 / E 413 - 04**
**On**

**6 in. (152 mm) Concrete Slab Floor-Ceiling Assembly with Suspended Gypsum Board Ceiling Overlaid with; Quarry Tile Flooring on 16 oz. Acoustiblok®**



Report Number: NGC 5006007

Assignment Number: G-287

Test Date: 01/24/2006

Report Date: 01/25/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director

Report Number: NGC 5006007

Test Method: This test method generally follows * the American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements - Designation: E 90 - 04 / E 413 - 04.

Specimen Description: Quarry Tile Flooring over 16 oz. Acoustiblok® on 6 in. concrete floor-ceiling assembly with suspended 5/8 in. gypsum board ceiling.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 152mm x 152mm x 12.7mm (6 in. x 6 in. x ½ in.) unglazed clay quarry tile 27.3 kg/m$^2$ (5.6 PSF) installed using polymer modified mortar and polymer modified grout mixtures 4.9 kg/m$^2$ (1.0 PSF).
- 1 layer of 2.46mm (0.097 in.) Acoustiblok® ,black sound isolation material 4.88 kg/m$^2$ (1.0 PSF).
- 152mm (6 in.) thick reinforced concrete slab 366 kg/m$^2$ (75.0 PSF).
- Drywall grid suspension system consisting of 15.9mm (5/8 in.) type X gypsum board 11.2 kg/m$^2$ (2.3 PSF) attached with 28.6mm (1-1/8in.) screws, 305mm (12 in.) o.c. to suspended grid suspension system. 305mm (12 in.) plenum with 89mm (3-1/2 in.) lay-in fiberglass insulation 0.78 kg/m$^2$ (0.16 PSF).

The overall weight of the test assembly is 415.3 kg/m$^2$ (85.1 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Test Floor Size: 3658mm x 4877mm (12 ft. x 16 ft.).

Conditioning: Mortar and grout cured for a minimum of 5 days. Concrete cured for a minimum of 28 days.

Test samples were submitted by client and tested as received.

Test Results: The results of the tests are given on pages 3 and 4.

* Tests conducted in Floor-Ceiling chambers do not meet all requirements of the most recent ASTM E 90 Standard.

NGC Testing Services℠

# Acoustical Testing Laboratory

## Sound Transmission Loss Test Data



**Per: ASTM E 90 - 04 / ASTM E 413 - 04**

No. of test report: NGC5006007
Test Date: 1/24/2006
Size: 17.8 m²
Temperature [°C]: 18.9

**Sound Transmission Class STC = 74 dB**
Sum of unfavorable deviations: 32.0 dB
Max. unfavorable deviation: 7.0 dB at 125 Hz

| Frequency [Hz] | STL [dB] | L1 [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | ΔSTL |
|---|---|---|---|---|---|---|---|
| 100 | 50 | 106.7 | 65.3 | 2.65 | 8.6 | -.- | 2.140 |
| 125 | 51 | 101.2 | 58.8 | 2.93 | 9.1 | 7.0 | 1.265 |
| 160 | 55 | 100.1 | 54.6 | 3.35 | 9.7 | 6.0 | 0.825 |
| 200 | 59 | 100.2 | 50.7 | 3.30 | 9.6 | 5.0 | 0.412 |
| 250 | 62 | 100.6 | 48.9 | 3.48 | 9.8 | 5.0 | 0.539 |
| 315 | 68 | 100.4 | 42.0 | 3.20 | 9.5 | 2.0 | 0.574 |
| 400 | 72 | 101.7 | 39.0 | 3.03 | 9.2 | 1.0 | 0.458 |
| 500 | 72 | 99.3 | 35.9 | 2.71 | 8.7 | 2.0 | 0.583 |
| 630 | 71 | 98.0 | 35.8 | 2.67 | 8.7 | 4.0 | 0.480 |
| 800 | 79 | 98.8 | 28.5 | 2.74 | 8.8 | -.- | 0.424 |
| 1000 | 83 | 98.0 | 24.0 | 2.65 | 8.6 | -.- | 0.566 |
| 1250 | 82 | 97.2 | 23.4 | 2.38 | 8.2 | -.- | 0.316 |
| 1600 | 82 | 98.3 | 23.8 | 2.18 | 7.8 | -.- | 0.346 |
| 2000 | 85 | 98.3 | 20.1 | 1.86 | 7.1 | -.- | 0.346 |
| 2500 | 86 | 100.3 | 21.3 | 1.67 | 6.6 | -.- | 0.200 |
| 3150 | 91 | 100.8 | 16.2 | 1.58 | 6.4 | -.- | 0.346 |
| 4000 | 92 | 99.7 | 13.5 | 1.42 | 5.9 | -.- | 0.361 |
| 5000 | 92 | 98.8 | 12.0 | 1.27 | 5.4 | -.- | 0.632 |

STL = Sound Transmission Loss, dB
L1 = Source Room Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
Δ STL = Uncertainty for 95% Confidence Level



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# Acoustical Testing Laboratory

## Sound Transmission Loss Test Data

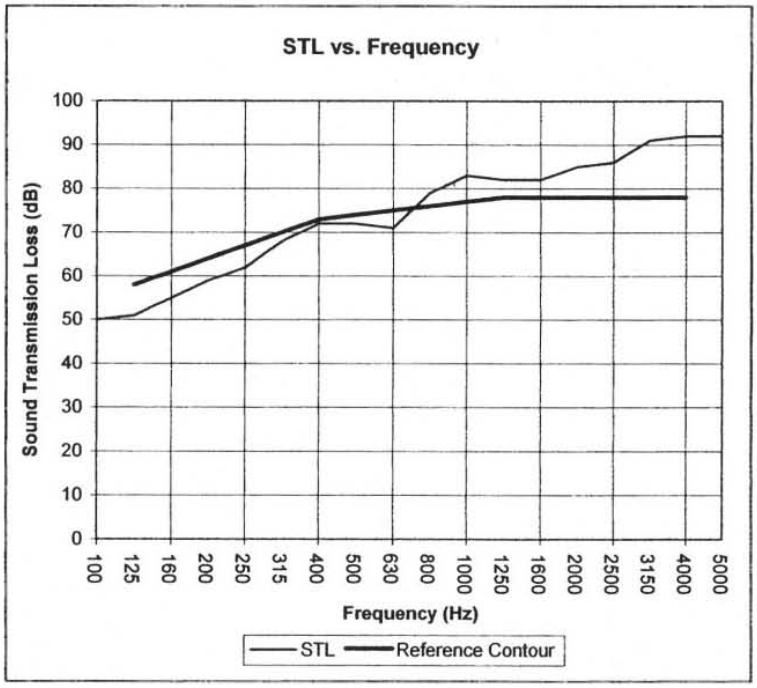


**Per: ASTM E 90 - 04 / ASTM E 413 - 04**

No. of test report: NGC5006007
Test Date: 1/24/2006
Size: 17.8 m²
Temperature [°C]: 18.9

**Sound Transmission Class STC = 74 dB**

| Frequency [Hz] | STL [dB] | ΔSTL | |
|---|---|---|---|
| 100 | 50 | 2.140 | |
| 125 | 51 | 1.265 | |
| 160 | 55 | 0.825 | |
| 200 | 59 | 0.412 | |
| 250 | 62 | 0.539 | |
| 315 | 68 | 0.574 | |
| 400 | 72 | 0.458 | * |
| 500 | 72 | 0.583 | * |
| 630 | 71 | 0.480 | * |
| 800 | 79 | 0.424 | * |
| 1000 | 83 | 0.566 | * |
| 1250 | 82 | 0.316 | * |
| 1600 | 82 | 0.346 | * |
| 2000 | 85 | 0.346 | * |
| 2500 | 86 | 0.200 | * |
| 3150 | 91 | 0.346 | * |
| 4000 | 92 | 0.361 | * |
| 5000 | 92 | 0.632 | * |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

STL = Sound Transmission Loss, dB
Δ STL = Uncertainty for 95% Confidence Level



National Gypsum

1650 Military Road • Buffalo, NY 14217-1198
(716)873-9750 • Fax (716)873-9753 • www.ngctestingservices.com

*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

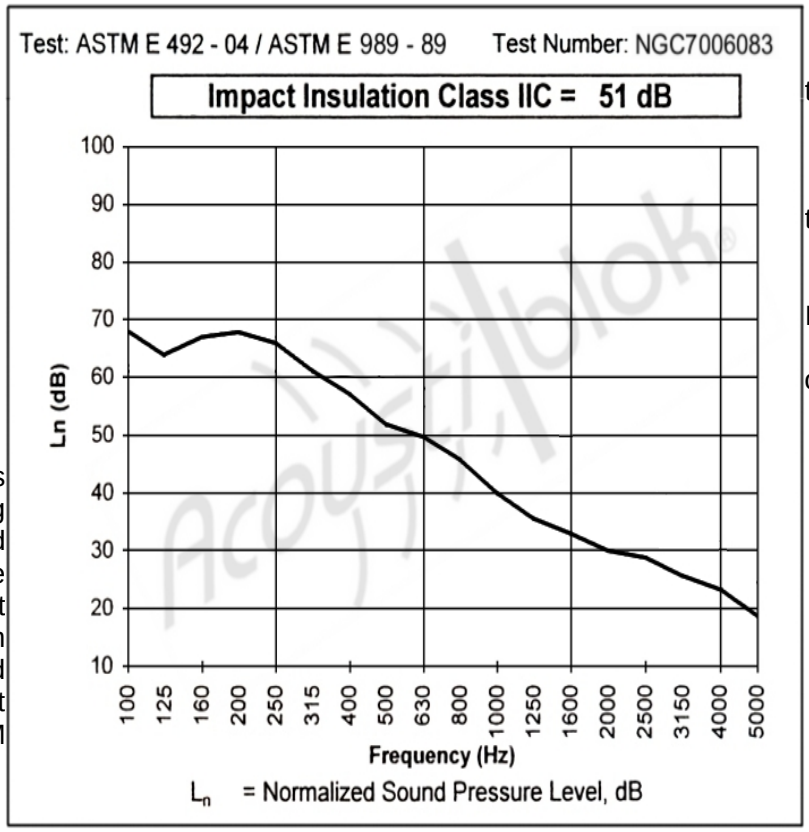
# Acoustiblok® 16 oz. and Acoustiwool™-WF0.125 with Oak Flooring on Hambro Floor Assembly: IIC51 and STC52 Rated Acoustical Test Overview


NGC Testing Services rates this floor configuration with an IIC (impact insulation class) of 51 dB, and an STC (sound transmission class) of 52. See report graphs below, showing the performance of this configuration relative to noise source frequencies.

The tested assembly: MD 2000 concrete/steel deck floor-ceiling with Acoustiwool-WF0.125 and Acoustiblok 16oz. under oak flooring, with 1/2" drywall ceiling.

**Impact Insulation Class** (IIC) is a single number rating used to compare performance of floor/ceiling partitions in blocking impact noise, such as footsteps and dropped objects. The higher the IIC rating number, the better performance. An IIC of 50 is usually considered the minimum for preventing noise complaints in residential building. ratings are calculated by a method similar to STC ratings (see description STC below).

The IIC of a particular floor assembly is derived using a standard tapping machine, as stipulated in ASTM method E492.3 This machine incorporates five steel-faced hammers that strike the test floor and generate noise in a room below. The noise levels are measured and used to calculate the impact insulation class (IIC), following ASTM method E989.




the

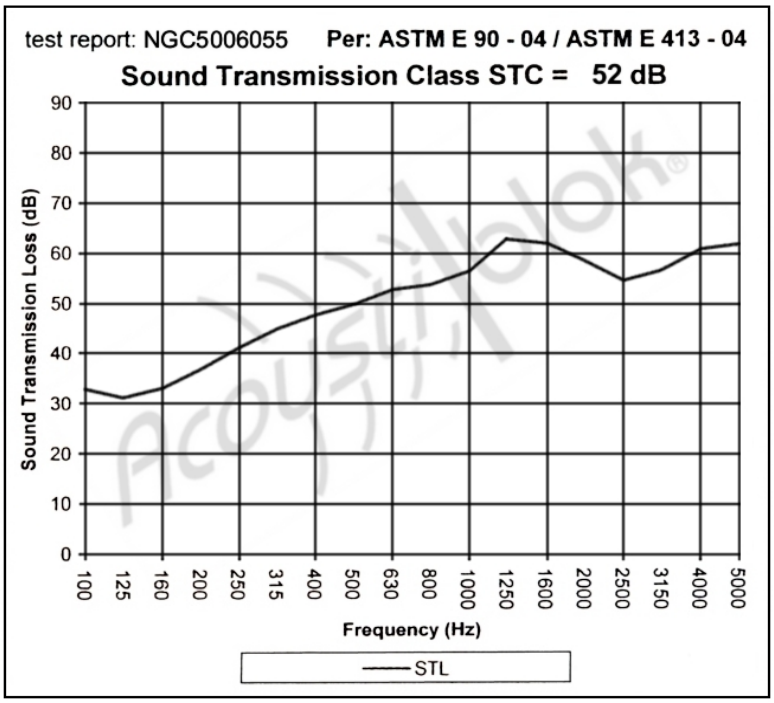
the

IIC

of

*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# Acoustiblok® 16 oz. and Acoustiwool™-WF0.125 with Oak Flooring on Hambro Floor Assembly: IIC51 and STC52 Rated Acoustical Test Overview




Sound Transmission Loss data for concrete & steel floor/ceiling assembly with 16 oz. Acoustiblok, STC 52 rated.

**SOUND TRANSMISSION CLASS** is a single number that represents the sound blocking capacity of a partition such as a wall or ceiling.

STC numbers are often called out in architectural specifications, to assure that partitions will reduce noise levels. For performance similar to laboratory test numbers, it is necessary to adhere closely to the construction materials and techniques used in the tested partition.

STC calculations emphasize sound frequencies that match the human voice. A high STC partition will block the sound of human speech, and block noise that interferes with human speech. A high STC number may not indicate a partition that is effective in blocking very low or very high pitched sound. STC measures sound blocking for airborne noise source only; it does not indicate how well a partition can block impact noise (objects striking the far side of the partition), or directly transmitted noise such as machinery mounted on the far side of the wall.

STC is calculated by comparing the actual sound loss measured when 18 test frequencies pass through a partition, with fixed values for each STC level. The highest STC curve that the measured sound loss numbers fit under, determines the STC rating of the tested partition.

NGC Testing Services®

# Acoustical Testing Laboratory

NVLAP®

Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

# TEST REPORT

for

Acoustiblok Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Meyers / 813-514-4531

## Impact Sound Transmission Test

**ASTM E 492 – 04 / ASTM E 989 – 89**
**On**

**Oak Flooring over ACOUSTIBLOK® & ACOUSTIWOOL on**
**Hambro MD2000 Composite Floor Joist System**
**Floor-Ceiling Assembly**
**With 4 Inch Concrete Floor and 1 Layer ½ Inch Gypsum Board Ceiling**



Report Number: NGC 7006083

Assignment Number: G-327

Test Date: 09/12/2006

Report Date: 10/18/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director



1650 Military Road · Buffalo, NY 14217-1198
(716)873-9750 · Fax (716)873-9753 · www.ngctestingservices.com

Report Number: NGC 7006083

Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine - Designation: E 492 – 04.

The uncertainty limits of each tapping machine location met the precision requirements of section 11.3 of ASTM E 492-04.

Specimen Description: Oak flooring over ACOUSTIBLOK® & ACOUSTIWOOL on Hambro® MD2000 Composite Floor Joist System floor-ceiling assembly.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 19.0mm (¾ in.) red oak tongue & groove flooring boards nailed to 19.0mm (¾ in.) plywood. 23.29 kg/m$^2$ (4.77 PSF)
- 1 layer of 2.64mm (0.104 in.) Acoustiblok® ,black sound isolation material 4.88 kg/m$^2$ (1.0 PSF).
- 1 layer 3.05mm (0.12) Acoustiwool fiber padding underlayment 0.88 kg/m$^2$ (0.18 PSF).
- 1 layer of nominal 101.6mm (4 in.) reinforced concrete 244 kg/m$^2$ (50 PSF).
- 1 layer of P3606 22 gauge steel deck with 38.1mm (1-1/2 in.) rib 8.2 kg/m$^2$ (1.68 PSF).
- 203.2mm (8 in.) steel joists 1219mm (48 in.) o.c. 10.4 kg/m (7.0 PLF) 10.6 kg/m$^2$ (2.18 PSF)
- 25 gauge steel hat channel 406.4mm (16 in.) o.c. positioned perpendicular to joists, and wire tied to bottom chord of beams.0.92 kg/m$^2$ (0.19 PSF)
- 1 layer 12.7mm (½ in.) Type C wallboard 10.2 kg/m$^2$ (2.1 PSF), attached 304.8mm (12 in.) o.c. to furring with 25.4mm (1 in.) type S screws The wallboard joints were taped and outer perimeter was sealed with acoustical caulk.

The overall weight of the test assembly is 303.21 kg/m$^2$ (62.1 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Specimen size: 3658mm x 4877mm (12 ft. x 16 ft.)

Steel and concrete assembly was constructed on premises under supervision of Hambro® personnel.

Conditioning: Concrete cured for a minimum of 28 days.

Test Results: The results of the tests are given on pages 3 and 4.

# Normalized impact sound pressure level

Test: ASTM E 492 - 04 / ASTM E 989 - 89



Test Number: NGC7006083 Date: 9/12/2006
Size: 17.8 m²

**Source room**
Temperature [°C]: 21.0
Humidity [%]: 52

**Receiving room**
Volume V = 44.33 m³
Temperature [°C]: 21.4
Humidity [%]: 52

## Impact Insulation Class IIC = 51 dB

Sum of unfavorable deviations: 28.0 dB
Max. unfavorable deviation: 7.0 dB at 100 Hz

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 100 | 68.0 | 70.2 | 1.27 | -2.2 | 7.0 | 0.301 |
| 125 | 64.0 | 67.8 | 1.58 | -3.8 | 3.0 | 0.310 |
| 160 | 67.0 | 72.4 | 2.24 | -5.4 | 6.0 | 0.334 |
| 200 | 68.0 | 72.6 | 2.23 | -4.6 | 7.0 | 0.234 |
| 250 | 66.0 | 70.5 | 2.25 | -4.5 | 5.0 | 0.205 |
| 315 | 61.0 | 66.7 | 2.48 | -5.7 | -.- | 0.189 |
| 400 | 57.0 | 63.1 | 2.61 | -6.1 | -.- | 0.119 |
| 500 | 52.0 | 57.4 | 2.45 | -5.4 | -.- | 0.097 |
| 630 | 50.0 | 55.2 | 2.17 | -5.2 | -.- | 0.114 |
| 800 | 46.0 | 51.1 | 2.40 | -5.1 | -.- | 0.060 |
| 1000 | 40.0 | 45.1 | 2.39 | -5.1 | -.- | 0.048 |
| 1250 | 36.0 | 40.8 | 2.15 | -4.8 | -.- | 0.045 |
| 1600 | 33.0 | 37.9 | 2.00 | -4.9 | -.- | 0.051 |
| 2000 | 30.0 | 33.8 | 1.78 | -3.8 | -.- | 0.038 |
| 2500 | 29.0 | 32.3 | 1.49 | -3.3 | -.- | 0.039 |
| 3150 | 26.0 | 29.1 | 1.37 | -3.1 | -.- | 0.049 |
| 4000 | 23.0 | 25.1 | 1.25 | -2.1 | -.- | 0.038 |
| 5000 | 19.0 | 21.2 | 1.13 | -2.2 | -.- | 0.044 |

$L_n$ = Normalized Sound Pressure Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
$\Delta L_n$ = Uncertainty for 95% Confidence Level

NGC Testing Services

# Acoustical Testing Laboratory

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Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

## Normalized impact sound pressure level

Test: ASTM E 492 - 04 / ASTM E 989 - 89

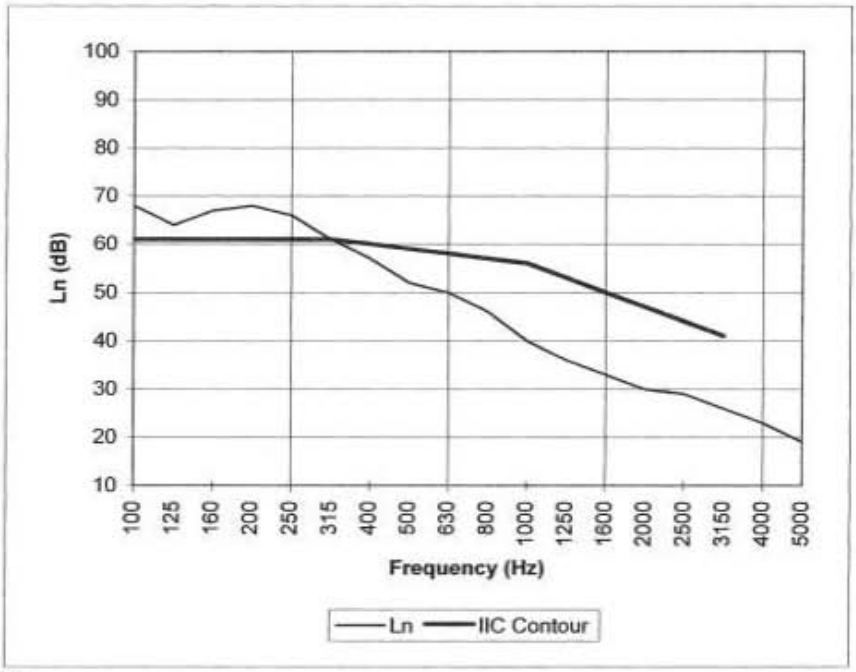


Test Number: NGC7006083

Date: 9/12/2006

**Impact Insulation Class IIC = 51 dB**

| Frequency [Hz] | $L_n$ [dB] |
|---|---|
| 100 | 68 |
| 125 | 64 |
| 160 | 67 |
| 200 | 68 |
| 250 | 66 |
| 315 | 61 |
| 400 | 57 |
| 500 | 52 |
| 630 | 50 |
| 800 | 46 |
| 1000 | 40 |
| 1250 | 36 |
| 1600 | 33 |
| 2000 | 30 |
| 2500 | 29 |
| 3150 | 26 |
| 4000 | 23 |
| 5000 | 19 * |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

$L_n$ = Normalized Sound Pressure Level, dB



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NGC Testing Services®

# Acoustical Testing Laboratory

# TEST REPORT

for

Acoustiblok Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Meyers / 813-514-4531

## Sound Transmission Loss Test

**ASTM E 90 – 04 / E 413 - 04**
**On**

**Oak Flooring over ACOUSTIBLOK® & ACOUSTIWOOL on**
**Hambro MD2000 Composite Floor Joist System**
**Floor-Ceiling Assembly**
**With 4 Inch Concrete Floor and 1 Layer ½ Inch Gypsum Board Ceiling**



Report Number: NGC 5006055

Assignment Number: G-327

Test Date: 09/12/2006

Report Date: 10/18/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director

Report Number: NGC 5006055

Test Method: This test method generally follows * the American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements - Designation: E 90 - 04 / E 413 - 04.

Specimen Description: Oak flooring over ACOUSTIBLOK® & ACOUSTIWOOL on Hambro® MD2000 Composite Floor Joist System floor-ceiling assembly.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 19.0mm (¾ in.) red oak tongue & groove flooring boards nailed to 19.0mm (¾ in.) plywood. 23.29 kg/m$^2$ (4.77 PSF)
- 1 layer of 2.64mm (0.104 in.) Acoustiblok® ,black sound isolation material 4.88 kg/m$^2$ (1.0 PSF).
- 1 layer 3.05mm (0.12) Acoustiwool fiber padding underlayment 0.88 kg/m$^2$ (0.18 PSF).
- 1 layer of nominal 101.6mm (4 in.) reinforced concrete 244 kg/m$^2$ (50 PSF).
- 1 layer of P3606 22 gauge steel deck with 38.1mm (1-1/2 in.) rib 8.2 kg/m$^2$ (1.68 PSF).
- 203.2mm (8 in.) steel joists 1219mm (48 in.) o.c. 10.4 kg/m (7.0 PLF) 10.6 kg/m$^2$ (2.18 PSF)
- 25 gauge steel hat channel 406.4mm (16 in.) o.c. positioned perpendicular to joists, and wire tied to bottom chord of beams.0.92 kg/m$^2$ (0.19 PSF)
- 1 layer 12.7mm (½ in.) Type C wallboard 10.2 kg/m$^2$ (2.1 PSF), attached 304.8mm (12 in.) o.c. to furring with 25.4mm (1 in.) type S screws The wallboard joints were taped and outer perimeter was sealed with acoustical caulk.

The overall weight of the test assembly is 303.21 kg/m$^2$ (62.1 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Specimen size: 3658mm x 4877mm (12 ft. x 16 ft.)

Steel and concrete assembly was constructed on premises under supervision of Hambro® personnel.

Conditioning: Concrete cured for a minimum of 28 days.

Test Results: The results of the tests are given on pages 3 and 4.

* Tests conducted in Floor-Ceiling chambers do not meet all requirements of the most recent ASTM E 90 Standard.

NGC Testing Services®

# Acoustical Testing Laboratory

## Sound Transmission Loss Test Data



**Per: ASTM E 90 - 04 / ASTM E 413 - 04**

No. of test report: NGC5006055
Test Date: 9/12/2006
Size: 17.8 m²
Temperature [°C]: 21.5

**Sound Transmission Class STC = 52 dB**
Sum of unfavorable deviations: 29.0 dB
Max. unfavorable deviation: 6.0 dB at 160 Hz

| Frequency [Hz] | STL [dB] | L1 [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | ΔSTL |
|---|---|---|---|---|---|---|---|
| 100 | 33.0 | 97.1 | 68.8 | 1.27 | 5.0 | -.- | 1.072 |
| 125 | 31.0 | 93.1 | 67.6 | 1.58 | 6.0 | 5.0 | 0.980 |
| 160 | 33.0 | 92.5 | 67.2 | 2.24 | 7.5 | 6.0 | 0.592 |
| 200 | 37.0 | 91.5 | 61.6 | 2.23 | 7.5 | 5.0 | 0.510 |
| 250 | 41.0 | 93.2 | 59.9 | 2.25 | 7.5 | 4.0 | 0.883 |
| 315 | 45.0 | 93.4 | 56.8 | 2.48 | 7.9 | 3.0 | 0.640 |
| 400 | 48.0 | 96.2 | 56.3 | 2.61 | 8.1 | 3.0 | 0.412 |
| 500 | 50.0 | 94.9 | 52.4 | 2.45 | 7.9 | 2.0 | 0.700 |
| 630 | 53.0 | 93.3 | 47.8 | 2.17 | 7.3 | -.- | 0.224 |
| 800 | 54.0 | 92.3 | 46.0 | 2.40 | 7.8 | -.- | 0.600 |
| 1000 | 57.0 | 91.8 | 42.4 | 2.39 | 7.8 | -.- | 0.346 |
| 1250 | 63.0 | 93.7 | 38.4 | 2.15 | 7.3 | -.- | 0.173 |
| 1600 | 62.0 | 95.7 | 40.7 | 2.00 | 7.0 | -.- | 0.300 |
| 2000 | 59.0 | 95.7 | 43.0 | 1.78 | 6.5 | -.- | 0.424 |
| 2500 | 55.0 | 94.9 | 45.5 | 1.49 | 5.7 | 1.0 | 0.300 |
| 3150 | 57.0 | 93.2 | 41.8 | 1.37 | 5.3 | -.- | 0.663 |
| 4000 | 61.0 | 93.6 | 37.7 | 1.25 | 4.9 | -.- | 0.548 |
| 5000 | 62.0 | 92.7 | 34.8 | 1.13 | 4.5 | -.- | 0.768 |

STL = Sound Transmission Loss, dB
L1 = Source Room Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
Δ STL = Uncertainty for 95% Confidence Level



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## Sound Transmission Loss Test Data

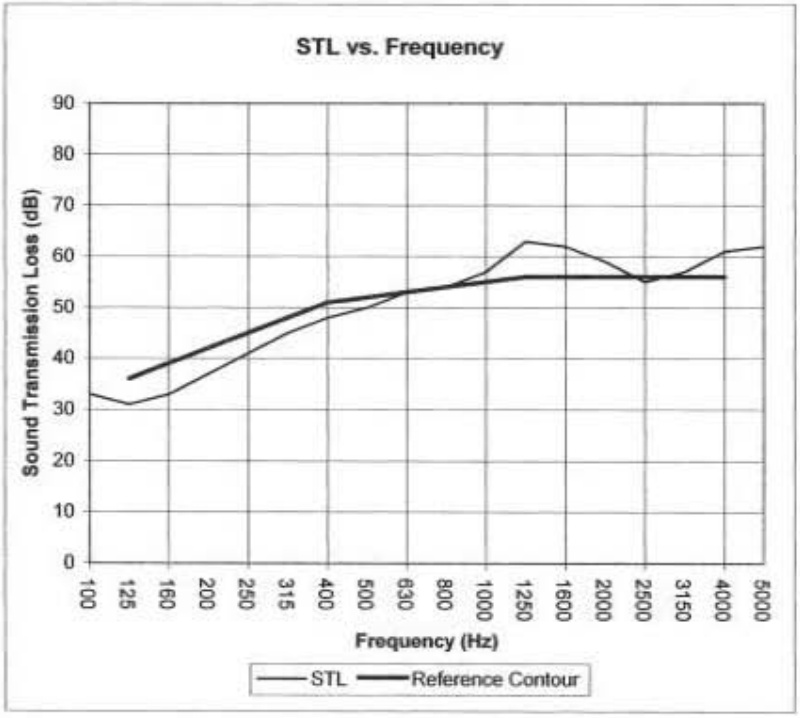


**Per: ASTM E 90 - 04 / ASTM E 413 - 04**

No. of test report: NGC5006055
Test Date: 9/12/2006
Size: 17.8 m²
Temperature [°C]: 21.5

**Sound Transmission Class STC = 52 dB**

| Frequency [Hz] | STL [dB] | ΔSTL |
|---|---|---|
| 100 | 33 | 1.072 |
| 125 | 31 | 0.980 |
| 160 | 33 | 0.592 |
| 200 | 37 | 0.510 |
| 250 | 41 | 0.883 |
| 315 | 45 | 0.640 |
| 400 | 48 | 0.412 |
| 500 | 50 | 0.700 |
| 630 | 53 | 0.224 |
| 800 | 54 | 0.600 |
| 1000 | 57 | 0.346 |
| 1250 | 63 | 0.173 |
| 1600 | 62 | 0.300 |
| 2000 | 59 | 0.424 |
| 2500 | 55 | 0.300 |
| 3150 | 57 | 0.663 |
| 4000 | 61 | 0.548 |
| 5000 | 62 | 0.768 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

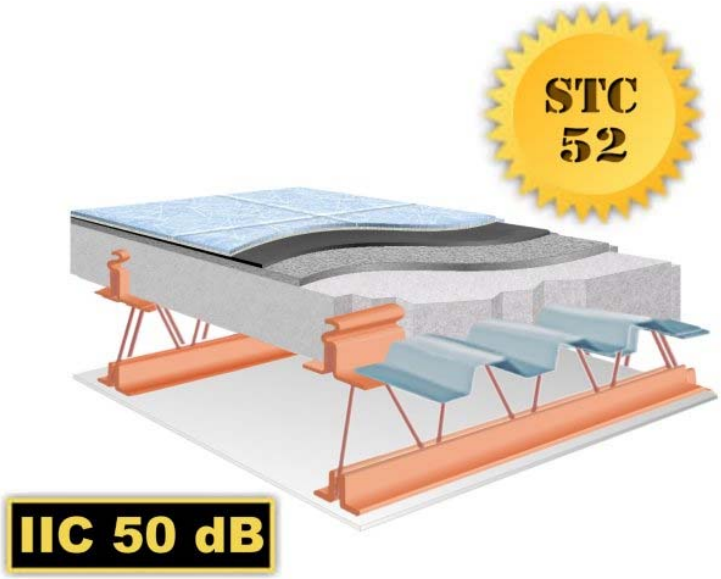
STL = Sound Transmission Loss, dB
Δ STL = Uncertainty for 95% Confidence Level



1650 Military Road · Buffalo, NY 14217-1198

*North American Office*
**Acoustiblok, Inc.**
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

# Acoustiblok® 16 oz. and Acoustiwool™-TF0.11 with Tile Floor on Hambro Floor Assembly: IIC50 and STC52 Rated Acoustical Test Overview

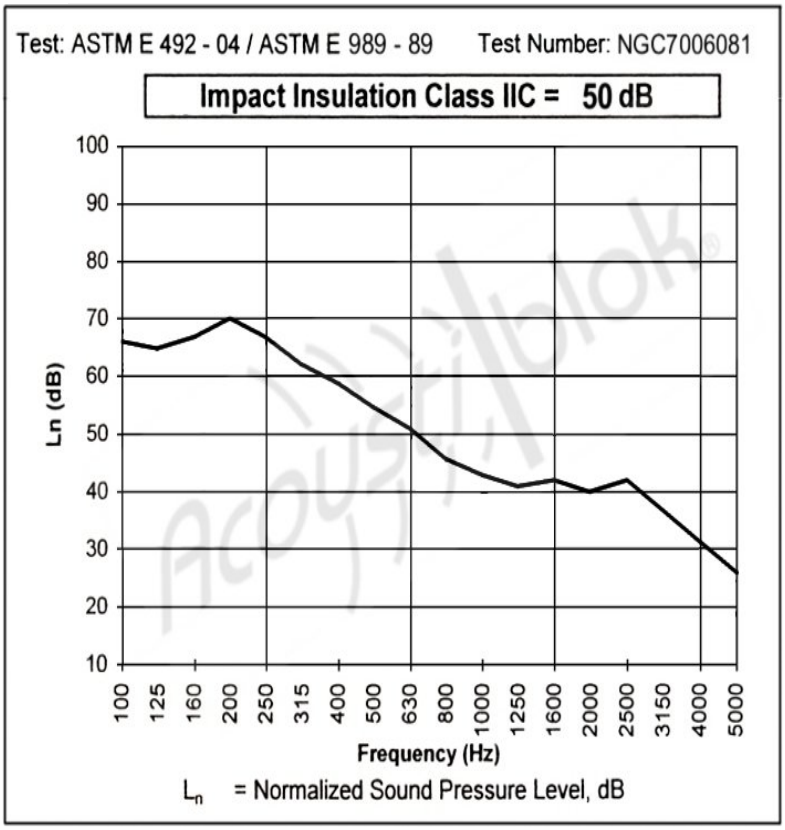



NGC Testing Services rates this floor configuration with an IIC (impact insulation class) of 50 dB, and an STC (sound transmission class) of 52. See report graphs below, which show the performance of this configuration relative to noise source frequencies.

The tested assembly: Hambro MD- 2000 concrete/steel deck floor-ceiling with Acoustiwool-TF0.11 and 16 oz. Acoustiblok under quarry tile flooring, 1/2" drywall ceiling.

**Impact Insulation Class** (IIC) is a single number rating used to compare the performance of floor/ceiling partitions in blocking impact noise, such as footsteps and dropped objects. The higher the IIC rating number, the better the performance. An IIC of 50 is usually considered the minimum for preventing noise complaints in residential building. IIC ratings are calculated by a method similar to STC ratings (see description of STC below).

The IIC of a particular floor assembly is derived using a standard tapping machine, as stipulated in ASTM method E492.3 This machine incorporates five steel-faced hammers that strike the test floor and generate noise in a room below. The noise levels are measured and used to calculate the impact insulation class (IIC), following ASTM method E989.



*North American Office*
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Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
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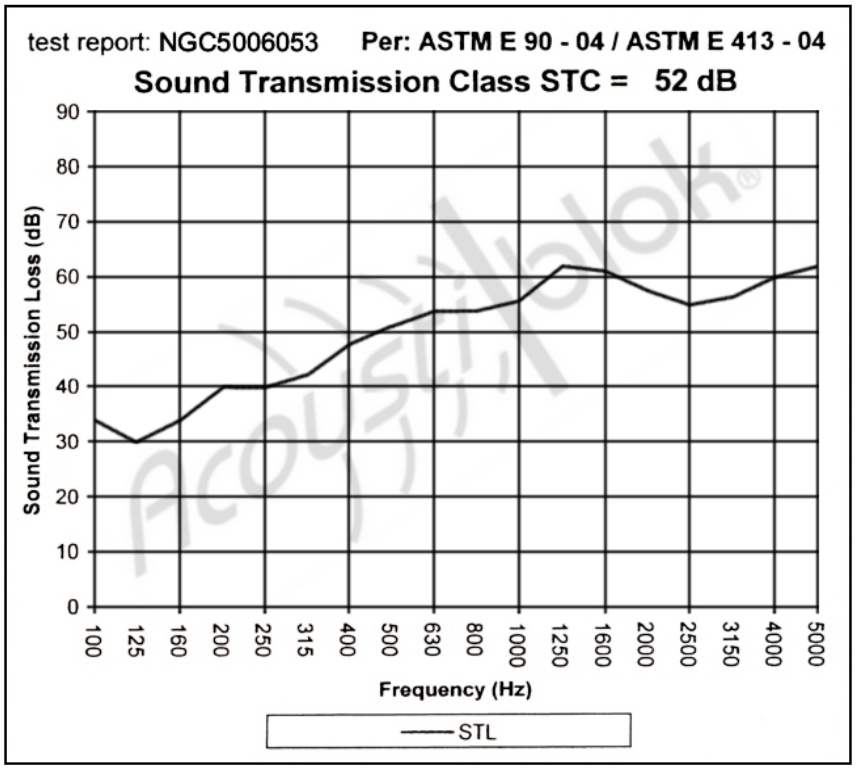


Sound Transmission Loss data for concrete & steel floor/ceiling assembly with 16 oz. Acoustiblok and Acoustiwool-TF0.11 rated STC 52.

**SOUND TRANSMISSION CLASS** is a single number that represents the sound blocking capacity of a partition such as a wall or ceiling.

STC numbers are often called out in architectural specifications, to assure that partitions will reduce noise levels. For performance similar to laboratory test numbers, it is necessary to adhere closely to the construction materials and techniques used in the tested partition.

STC calculations emphasize sound frequencies that match the human voice. A high STC partition will block the sound of human speech, and block noise that interferes with human speech. A high STC number may not indicate a partition that is effective in blocking very low or very high pitched sound. STC measures sound blocking for airborne noise source only; it does not indicate how well a partition can block impact noise (objects striking the far side of the partition), or directly transmitted noise such as machinery mounted on the far side of the wall.

STC is calculated by comparing the actual sound loss measured when 18 test frequencies pass through a partition, with fixed values for each STC level. The highest STC curve that the measured sound loss numbers fit under, determines the STC rating of the tested partition.

NGC Testing Services®

# Acoustical Testing Laboratory

Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code 200291

# TEST REPORT

for

Acoustiblok Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Meyers / 813-514-4531

## Impact Sound Transmission Test

**ASTM E 492 – 04 / ASTM E 989 – 89**
**On**

**Quarry Tile over ACOUSTIBLOK® & ACOUSTIWOOL on**
**Hambro MD2000 Composite Floor Joist System**
**Floor-Ceiling Assembly**
**With 4 Inch Concrete Floor and 1 Layer ½ Inch Gypsum Board Ceiling**



Report Number: NGC 7006081

Assignment Number: G-327

Test Date: 09/07/2006

Report Date: 10/18/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menichetti
Director



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(716)873-9750 · Fax (716)873-9753 · www.ngctestingservices.com

Report Number: NGC 7006081

Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine - Designation: E 492 – 04.

The uncertainty limits of each tapping machine location met the precision requirements of section 11.3 of ASTM E 492-04.

Specimen Description: Quarry Tile over ACOUSTIBLOK® & ACOUSTIWOOL on Hambro® MD2000 Composite Floor Joist System floor-ceiling assembly.

The test specimen was a floor-ceiling assembly consisting of the following:

- 1 layer of 152mm x 152mm x 12.7mm (6 in. x 6 in. x ½ in.) unglazed clay quarry tile 27.3 kg/m$^2$ (5.6 PSF) installed using Laticrete® 317 Thin Set Mortar with Laticrete® 333 Thin Set Additive and polymer modified grout mixtures 4.9 kg/m$^2$ (1.0 PSF).
- 1 layer of 2.64mm (0.104 in.) Acoustiblok® ,black sound isolation material 4.88 kg/m$^2$ (1.0 PSF).
- 1 layer 3.05mm (0.12) Acoustiwool fiber padding underlayment 0.88 kg/m$^2$ (0.18 PSF).
- 1 layer of nominal 101.6mm (4 in.) reinforced concrete 244 kg/m$^2$ (50 PSF).
- 1 layer of P3606 22 gauge steel deck with 38.1mm (1-1/2 in.) rib 8.2 kg/m$^2$ (1.68 PSF).
- 203.2mm (8 in.) steel joists 1219mm (48 in.) o.c. 10.4 kg/m (7.0 PLF) 10.6 kg/m$^2$ (2.18 PSF)
- 25 gauge steel hat channel 406.4mm (16 in.) o.c. positioned perpendicular to joists, and wire tied to bottom chord of beams.0.92 kg/m$^2$ (0.19 PSF)
- 1 layer 12.7mm (½ in.) Type C wallboard 10.2 kg/m$^2$ (2.1 PSF), attached 304.8mm (12 in.) o.c. to furring with 25.4mm (1 in.) type S screws The wallboard joints were taped and outer perimeter was sealed with acoustical caulk.

The overall weight of the test assembly is 312.1 kg/m$^2$ (63.93 PSF) nominal.

The perimeter of the floor assembly was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

Specimen size: 3658mm x 4877mm (12 ft. x 16 ft.)

Steel and concrete assembly was constructed on premises under supervision of Hambro® personnel.

Conditioning: Concrete cured for a minimum of 28 days. Mortar and grout cured for a minimum of 6 days.

Test Results: The results of the tests are given on pages 3 and 4.

NGC Testing Services

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## Normalized impact sound pressure level

Test: ASTM E 492 - 04 / ASTM E 989 - 89



Test Number: NGC7006081 Date: 9/7/2006
Size: 17.8 m²

**Source room**

Temperature [°C]: 21.7
Humidity [%]: 60

**Receiving room**
Volume V = 44.33 m³
Temperature [°C]: 21.4
Humidity [%]: 53

**Impact Insulation Class IIC = 50 dB**
Sum of unfavorable deviations: 25.0 dB
Max. unfavorable deviation: 8.0 dB at 200 Hz

| Frequency [Hz] | $L_n$ [dB] | L2 [dB] | T [s] | Corr. [dB] | u.Dev. [dB] | $\Delta L_n$ |
|---|---|---|---|---|---|---|
| 100 | 66.0 | 68.7 | 1.34 | -2.7 | 4.0 | 0.347 |
| 125 | 65.0 | 68.4 | 1.66 | -3.4 | 3.0 | 0.254 |
| 160 | 67.0 | 72.2 | 2.52 | -5.2 | 5.0 | 0.338 |
| 200 | 70.0 | 74.6 | 2.25 | -4.6 | 8.0 | 0.252 |
| 250 | 67.0 | 71.2 | 2.10 | -4.2 | 5.0 | 0.182 |
| 315 | 62.0 | 66.9 | 2.35 | -4.9 | -.- | 0.165 |
| 400 | 59.0 | 64.4 | 2.40 | -5.4 | -.- | 0.180 |
| 500 | 55.0 | 59.7 | 2.26 | -4.7 | -.- | 0.130 |
| 630 | 51.0 | 55.4 | 2.03 | -4.4 | -.- | 0.125 |
| 800 | 46.0 | 51.1 | 2.19 | -5.1 | -.- | 0.099 |
| 1000 | 43.0 | 47.9 | 2.20 | -4.9 | -.- | 0.047 |
| 1250 | 41.0 | 45.6 | 1.93 | -4.6 | -.- | 0.043 |
| 1600 | 42.0 | 46.1 | 1.73 | -4.1 | -.- | 0.048 |
| 2000 | 40.0 | 43.7 | 1.56 | -3.7 | -.- | 0.051 |
| 2500 | 42.0 | 44.3 | 1.33 | -2.3 | -.- | 0.043 |
| 3150 | 37.0 | 39.3 | 1.22 | -2.3 | -.- | 0.040 |
| 4000 | 31.0 | 33.5 | 1.15 | -2.5 | -.- | 0.051 |
| 5000 | 26.0 | 27.2 | 1.05 | -1.2 | -.- | 0.040 |

$L_n$ = Normalized Sound Pressure Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
$\Delta L_n$ = Uncertainty for 95% Confidence Level



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## Normalized impact sound pressure level

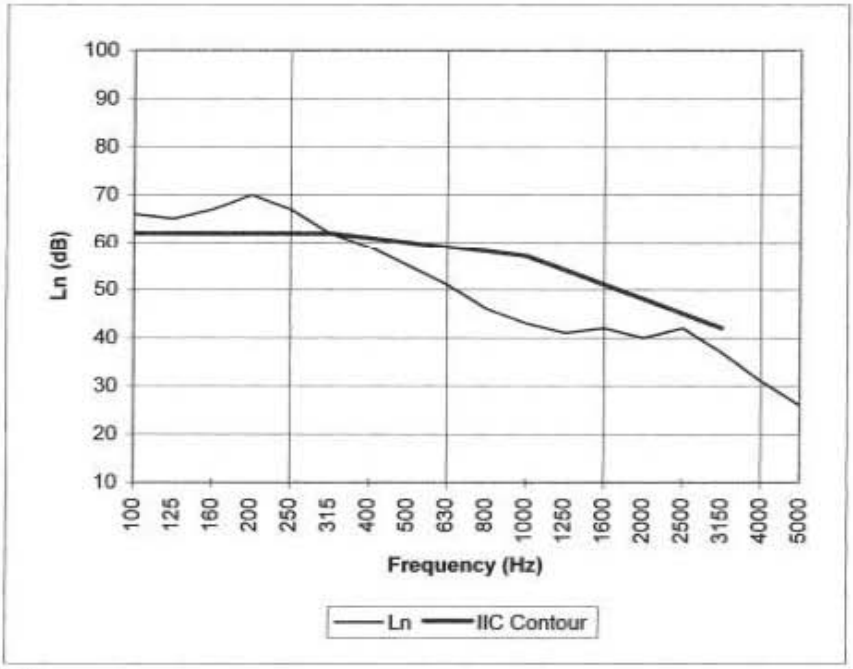
Test: ASTM E 492 - 04 / ASTM E 989 - 89



Test Number: NGC7006081 Date: 9/7/2006

**Impact Insulation Class IIC = 50 dB**

| Frequency [Hz] | $L_n$ [dB] |
|---|---|
| 100 | 66 |
| 125 | 65 |
| 160 | 67 |
| 200 | 70 |
| 250 | 67 |
| 315 | 62 |
| 400 | 59 |
| 500 | 55 |
| 630 | 51 |
| 800 | 46 |
| 1000 | 43 |
| 1250 | 41 |
| 1600 | 42 |
| 2000 | 40 |
| 2500 | 42 |
| 3150 | 37 |
| 4000 | 31 |
| 5000 | 26 |




* Due to high insulating value of specimen, background levels limit results at these frequencies.

$L_n$ = Normalized Sound Pressure Level, dB

NGC Testing Services®

# Acoustical Testing Laboratory

# TEST REPORT

for

Acoustiblok Inc.
6900 Interbay Blvd.
Tampa, FL 33616
Marilyn Meyers / 813-514-4531

## Sound Transmission Loss Test

**ASTM E 90 – 04 / E 413 - 04**
**On**

**Quarry Tile over ACOUSTIBLOK® & ACOUSTIWOOL on**
**Hambro MD2000 Composite Floor Joist System**
**Floor-Ceiling Assembly**
**With 4 Inch Concrete Floor and 1 Layer ½ Inch Gypsum Board Ceiling**



Report Number: NGC 5006053

Assignment Number: G-327

Test Date: 09/07/2006

Report Date: 10/18/2006

Submitted by: _____
Craig G. Cooper
Test Engineer

Reviewed by: _____
Robert J. Menchetti
Director

The results reported above apply to specific samples submitted for measurement.
No responsibility is assumed for performance of any other specimen.
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The laboratory's test reports in no way constitutes or implies product certification, approval, or endorsement by this laboratory.

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