



# Acoustical Testing Laboratory



Accredited by the National Voluntary  
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under Lab Code 200291

## TEST REPORT

For

Noble Company  
7300 Enterprise Drive  
Spring Lake, MI 49456  
Jim Wadaga / 231-799-1223

**Impact Sound Transmission Test**  
ASTM E 492 - 04 / ASTM E 989 - 06

On

**6 Inch (152mm) Concrete Slab Overlaid with  
12 Inch x 12 Inch Porcelain Tile with Mortar on  
NobleSeal® SIS Membrane on NobleBond 21 Adhesive**

Page 1 of 4

Report Number: NGC 7008169

Assignment Number: G-468

Test Date: 11/03/2008

Report Date: 11/17/2008

Submitted by: \_\_\_\_\_

*Craig G. Cooper*  
Craig G. Cooper  
Test Engineer

Reviewed by: \_\_\_\_\_

*Robert J. Menchetti*  
Robert J. Menchetti  
Director

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Page 2 of 4

Report Number: NGC 7008169

**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:** 6 inch (152mm) Concrete Slab Overlaid with, according to client, 305mm (12 in.) porcelain tile over, NobleSeal® SIS membrane adhered with NobleBond 21 adhesive.

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

- 1 layer of 304.8mm x 304.8mm (12 in. x 12 in.) porcelain tile. Sample was measured to be 7.8mm (0.309in.) thick and weighed 15.9 kg/m<sup>2</sup> (3.25 PSF).
- 1 layer of VersaBond Fortified thin-set mortar. Sample was troweled on with a 6.3mm x 9.5mm x 6.3mm (1/4 in. x 3/8 in. x 1/4 in.) square notch trowel. Approximate weight for mortar and grout mixes is 4.8 kg/m<sup>2</sup> (1.0 PSF). Mapei sanded grout was used to fill the tile joints.
- Sound Isolation Sheet, NobelSeal® SIS Membrane. Sample was measured to be 1.47mm (0.058in.) thick and weighed 1.66 kg/m<sup>2</sup> (0.34 PSF). Membrane was rolled into underlying adhesive.
- Noble Bond 21 Adhesive was installed with a Frieze Roller.
- 4 mil poly sheeting attached to concrete with double sided tape at seams and perimeter.
- 152mm (6 in.) thick reinforced concrete slab 366.1 kg/m<sup>2</sup> (75.0 PSF).

The overall weight of the test assembly is 388.0 kg/m<sup>2</sup> (79.59 PSF).

The perimeter of the concrete slab was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room. The ceiling joints were taped and the perimeter was sealed with acoustical caulk.

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

**Conditioning:** Mortar and grout cured for minimum of 7 days.

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

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Normalized impact sound pressure level						
Test: ASTM E 492 - 04 / ASTM E 989 - 06						
Test Number: NGC7008169						Page 3 of 4
Size: 17.8 m <sup>2</sup>						Date: 11/3/2008
Source room			Receiving room			
Temperature [°C]: 18.9			Volume V = 63.9 m <sup>3</sup>			
Humidity [%]: 48			Temperature [°C]: 19.1			
			Humidity [%]: 59			
Impact Insulation Class IIC = 39 dB						
Sum of unfavorable deviations: 23.0 dB						
Max. unfavorable deviation: 8.0 dB at 3150 Hz						
Frequency	L <sub>n</sub>	L <sub>2</sub>	T	Corr.	u.Dev.	ΔL <sub>n</sub>
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]	
50	60	65.7	3.87	-5.7	--	0.398
63	56	61.0	3.04	-5.0	--	0.304
80	57	62.7	4.28	-5.7	--	0.403
100	59	64.5	3.70	-5.5	--	0.557
125	66	72.2	4.05	-6.2	--	0.277
160	66	72.1	4.09	-6.1	--	0.209
200	67	72.9	3.84	-5.9	--	0.181
250	68	72.4	3.07	-4.4	--	0.120
315	67	72.2	3.12	-5.2	--	0.116
400	68	73.0	2.96	-5.0	--	0.103
500	68	71.7	2.68	-3.7	--	0.063
630	69	72.6	2.57	-3.6	--	0.053
800	66	69.9	2.56	-3.9	--	0.049
1000	65	68.8	2.44	-3.8	--	0.049
1250	65	68.7	2.19	-3.7	--	0.046
1600	65	68.5	2.13	-3.5	3	0.040
2000	64	67.3	1.97	-3.3	5	0.049
2500	63	65.3	1.82	-2.3	7	0.037
3150	61	63.1	1.65	-2.1	8	0.030
4000	60	61.7	1.44	-1.7	--	0.037
5000	55	55.9	1.27	-0.9	--	0.033

L<sub>n</sub> = Normalized Sound Pressure Level, dB  
 L<sub>2</sub> = Receiving Room Level, dB  
 T = Reverberation Time, seconds  
 ΔL<sub>n</sub> = Uncertainty for 95% Confidence Level

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## Normalized impact sound pressure level

Test: ASTM E 492 - 04 / ASTM E 989 - 06

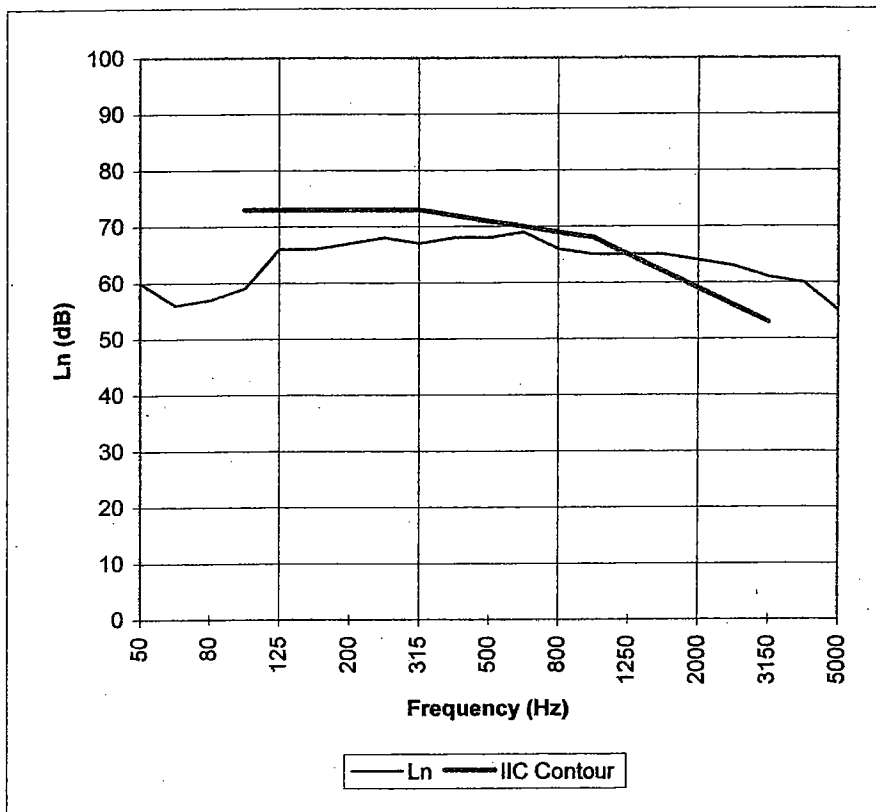
Page 4 of 4

Test Number: NGC7008169

Date: 11/3/2008

**Impact Insulation Class IIC = 39 dB**

Frequency [Hz]	$L_n$ [dB]
50	60
63	56
80	57
100	59
125	66
160	66
200	67
250	68
315	67
400	68
500	68
630	69
800	66
1000	65
1250	65
1600	65
2000	64
2500	63
3150	61
4000	60
5000	55



\* 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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## TEST REPORT

For

Noble Company  
7300 Enterprise Drive  
Spring Lake, MI 49456  
Jim Wadaga / 231-799-1223

### Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors Test ASTM E 2179 - 03 On

6 Inch (152mm) Concrete Slab Overlaid with  
12 Inch x 12 Inch Porcelain Tile with Mortar on  
NobleSeal® SIS Membrane on NobleBond 21 Adhesive

Page 1 of 6

Report Number: NGC 7008170

Assignment Number: G-468

Test Date: 11/03/2008

Report Date: 11/24/2008

Submitted by: \_\_\_\_\_

*Craig G. Cooper*  
Craig G. Cooper  
Test Engineer

Reviewed by: \_\_\_\_\_

*Robert J. Menchetti*  
Robert J. Menchetti  
Director

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Page 2 of 6

Report Number: NGC 7008170

**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:** 6 inch (152mm) Concrete Slab Overlaid with, according to client, 305mm (12 in.) porcelain tile over, NobleSeal® SIS membrane adhered with NobleBond 21 adhesive.

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

- 1 layer of 304.8mm x 304.8mm (12 in. x 12 in.) porcelain tile. Sample was measured to be 7.8mm (0.309in.) thick and weighed  $15.9 \text{ kg/m}^2$  (3.25 PSF).
- 1 layer of VersaBond Fortified thin-set mortar. Sample was troweled on with a 6.3mm x 9.5mm x 6.3mm (1/4 in. x 3/8 in. x 1/4 in.) square notch trowel. Approximate weight for mortar and grout mixes is  $4.8 \text{ kg/m}^2$  (1.0 PSF). Mapei sanded grout was used to fill the tile joints.
- Sound Isolation Sheet, NobelSeal® SIS Membrane. Sample was measured to be 1.47mm (0.058in.) thick and weighed  $1.66 \text{ kg/m}^2$  (0.34 PSF). Membrane was rolled into underlying adhesive.
- Noble Bond 21 Adhesive was installed with a Frieze Roller.
- 4 mil poly sheeting attached to concrete with double sided tape at seams and perimeter.
- 152mm (6 in.) thick reinforced concrete slab  $366.1 \text{ kg/m}^2$  (75.0 PSF).

The overall weight of the test assembly is  $388.0 \text{ kg/m}^2$  (79.59 PSF).

The perimeter of the concrete slab was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room. The ceiling joints were taped and the perimeter was sealed with acoustical caulk.

**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 minimum of 7 days.

**Test Results:** The results of the tests are given on pages 3 through 6.

The results reported above apply to specific samples submitted for measurement.

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# Acoustical Testing Laboratory



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Test: ASTM E 2179 - 03		Bare 6" Concrete Slab					Page 3 of 6
Test Number: NGC7008170		Date: 11/3/2008					
Size: 17.8 m <sup>2</sup>							
Frequency	L <sub>n</sub>	L <sub>2</sub>	T	Corr.	u.Dev.	ΔL <sub>n</sub>	
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]		
50	61.0	67.0	3.98	-6.0	--	0.408	
63	57.0	61.7	3.18	-4.7	--	0.278	
80	59.0	65.0	4.31	-6.0	--	0.327	
100	65.0	69.9	3.52	-4.9	--	0.475	
125	65.0	70.6	3.69	-5.6	--	0.290	
160	67.0	73.3	4.48	-6.3	--	0.264	
200	68.0	73.9	4.22	-5.9	--	0.204	
250	70.0	75.2	3.12	-5.2	--	0.118	
315	69.0	74.1	3.05	-5.1	--	0.086	
400	69.0	73.4	2.81	-4.4	--	0.086	
500	68.0	72.4	2.65	-4.4	--	0.057	
630	70.0	73.4	2.47	-3.4	--	0.057	
800	69.0	73.3	2.52	-4.3	--	0.045	
1000	71.0	74.3	2.38	-3.3	--	0.037	
1250	71.0	74.3	2.10	-3.3	--	0.051	
1600	72.0	74.8	1.99	-2.8	--	0.033	
2000	72.0	74.8	1.84	-2.8	1.0	0.033	
2500	73.0	75.2	1.69	-2.2	5.0	0.041	
3150	73.0	75.2	1.53	-2.2	8.0	0.041	
4000	76.0	76.7	1.34	-0.7	--	0.035	
5000	74.0	74.2	1.17	-0.2	--	0.033	

L<sub>n</sub> = Normalized Sound Pressure Level, dB  
 L<sub>2</sub> = Receiving Room Level, dB  
 T = Reverberation Time, seconds  
 ΔL<sub>n</sub> = Uncertainty for 95% Confidence Level

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Test: ASTM E 2179 - 03		6" Concrete Slab with Specimen				
Test Number: NGC7008170		Date: 11/3/2008			Page 4 of 6	
Size: 17.8 m <sup>2</sup>						
<b>Source room</b>			<b>Receiving room</b>			
Temperature [°C]: 18.9			Volume V = 63.9 m <sup>3</sup>			
Humidity [%]: 48			Temperature [°C]: 19.1			
			Humidity [%]: 59			
Frequency	L <sub>n</sub>	L <sub>2</sub>	T	Corr.	u.Dev.	ΔL <sub>n</sub>
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]	
50	60	65.7	3.87	-5.7	--	0.398
63	56	61.0	3.04	-5.0	--	0.304
80	57	62.7	4.28	-5.7	--	0.403
100	59	64.5	3.70	-5.5	--	0.557
125	66	72.2	4.05	-6.2	--	0.277
160	66	72.1	4.09	-6.1	--	0.209
200	67	72.9	3.84	-5.9	--	0.181
250	68	72.4	3.07	-4.4	--	0.120
315	67	72.2	3.12	-5.2	--	0.116
400	68	73.0	2.96	-5.0	--	0.103
500	68	71.7	2.68	-3.7	--	0.063
630	69	72.6	2.57	-3.6	--	0.053
800	66	69.9	2.56	-3.9	--	0.049
1000	65	68.8	2.44	-3.8	--	0.049
1250	65	68.7	2.19	-3.7	--	0.046
1600	65	68.5	2.13	-3.5	3.0	0.040
2000	64	67.3	1.97	-3.3	5.0	0.049
2500	63	65.3	1.82	-2.3	7.0	0.037
3150	61	63.1	1.65	-2.1	8.0	0.030
4000	60	61.7	1.44	-1.7	--	0.037
5000	55	55.9	1.27	-0.9	--	0.033

L<sub>n</sub> = Normalized Sound Pressure Level, dB  
 L<sub>2</sub> = Receiving Room Level, dB  
 T = Reverberation Time, seconds  
 ΔL<sub>n</sub> = Uncertainty for 95% Confidence Level



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

Test: ASTM E 2179 - 03

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Test Number: NGC7008170  
 Size: 17.8 m<sup>2</sup>

Date: 11/3/2008

**Increase in Impact Insulation Class  $\Delta IIC = 12.0$**

Frequency	$L_o$	$L_c$	$L_d$	$L_{ref}$	$L_{ref,c}$
[Hz]	[dB]	[dB]	[dB]	[dB]	[dB]
100	65.0	59.0	6.0	67.0	61.0
125	65.0	66.0	-1.0	67.5	68.5
160	67.0	66.0	1.0	68.0	67.0
200	68.0	67.0	1.0	68.5	67.5
250	70.0	68.0	2.0	69.0	67.0
315	69.0	67.0	2.0	69.5	67.5
400	69.0	68.0	1.0	70.0	69.0
500	68.0	68.0	0.0	70.5	70.5
630	70.0	69.0	1.0	71.0	70.0
800	69.0	66.0	3.0	71.5	68.5
1000	71.0	65.0	6.0	72.0	66.0
1250	71.0	65.0	6.0	72.0	66.0
1600	72.0	65.0	7.0	72.0	65.0
2000	72.0	64.0	8.0	72.0	64.0
2500	73.0	63.0	10.0	72.0	62.0
3150	73.0	61.0	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  
 $L_{ref}$  = Reference Floor Average Normalized Impact Sound Pressure Level, dB  
 $L_{ref,c}$  =  $L_{ref} - L_d$ , dB

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

Test: ASTM E 2179 - 03

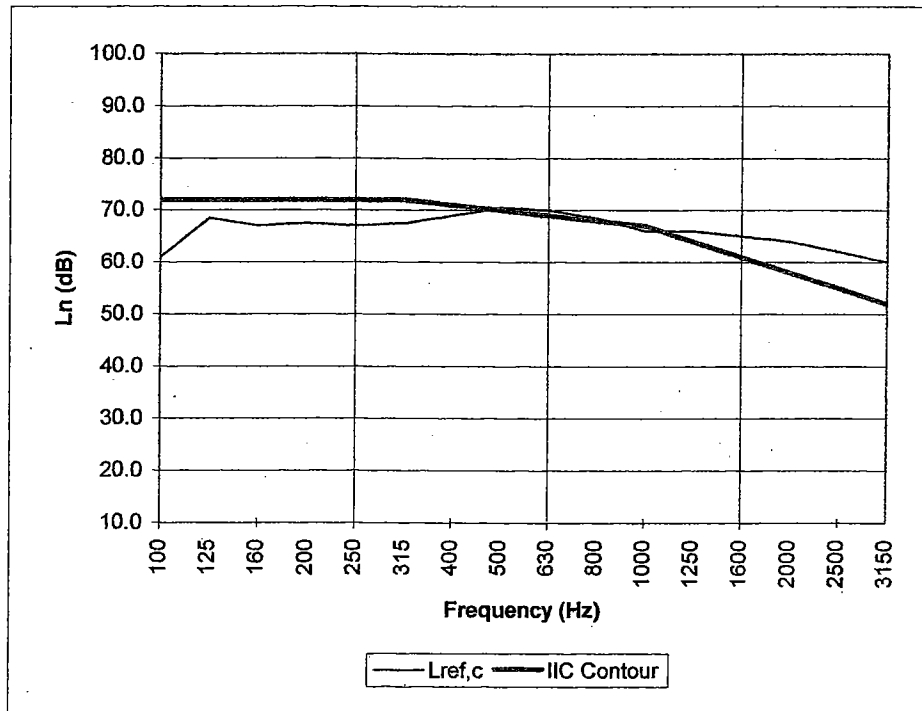
Page 6 of 6

Test Number: NGC7008170

Date: 11/3/2008

**Increase in Impact Insulation Class  $\Delta IIC = 12.0$**

Frequency [Hz]	Lref,c [dB]
100	61.0
125	68.5
160	67.0
200	67.5
250	67.0
315	67.5
400	69.0
500	70.5
630	70.0
800	68.5
1000	66.0
1250	66.0
1600	65.0
2000	64.0
2500	62.0
3150	60.0



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

Lref,c = Lref - Ld, dB

L<sub>n</sub> = Normalized Sound Pressure Level, dB

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