E1551.01-113-11-R0
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E 90, ASTM E 492, ASTM E 2179

Rendered to

REGUPOL AMERICA

Series/Model: 3 mm Regupol Sonus Rubber Underlayment

Specimen Type: Floor/Ceiling Assembly

Overall Size: 3023 mm by 3632 mm

STC	**53**
IIC	**50**
ΔIIC	**20**

Test Specimen Identification:
Floor Topping: 7 mm Ceramic Tile
Floor Underlayment: 3 mm Regupol Sonus Rubber Underlayment
Floor Slab: 152 mm Concrete slab

Reference should be made to Architectural Testing, Inc. Report E1551.01-113-11 for complete test specimen description.

Acoustical Performance Test Report

REGUPOL AMERICA
33 Keystone Drive
Lebanon, Pennsylvania 17042

Report	E1551.01-113-11
Test Date	09/26/14
Report Date	01/05/15
Record Retention End Date	09/26/18

Project Scope

Regupol America contracted Architectural Testing to conduct airborne sound transmission loss, impact sound transmission, and delta impact insulation tests. A summary of the results is listed in the Test Results section, and the complete test data is included as attachments to this report. The client provided the test specimen.

Test Methods

The acoustical tests were conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E 90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 413-10, Classification for Rating Sound Insulation
ASTM E 492-09, Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
ASTM E 2179-03 (2009), Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete
ASTM E 989-06 (2012), Classification for Determination of Impact Insulation Class (IIC)
ASTM E 2235-04 (2012) Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods

Test Procedure

All testing was conducted in the VT test chambers at Architectural Testing, Inc. located in York, Pennsylvania. The microphones were calibrated before conducting the tests.

The airborne transmission loss test was conducted in accordance with the ASTM E 90 test method using the single direction method. Two background noise sound pressure level and twenty sound absorption measurements were conducted at each of five microphone positions.

Test Procedure (Continued)
Four sound pressure level measurements were made simultaneously in both rooms, at each of five microphone positions.

The impact sound transmission test was conducted in accordance with the ASTM E 492 test method. Two background noise sound pressure level, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E 492, and twenty sound absorption measurements were conducted at each of five microphone positions.

The delta impact insulation test was conducted in accordance with ASTM E 2179 test method. In addition to the impact sound transmission test, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E 492 with only the concrete slab installed.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Test Conditions

Source Room		Receive Room	
Maximum Temperature	18.6 °C	Maximum Temperature	20.1 °C
Minimum Temperature	18.3 °C	Minimum Temperature	20.1 °C
Average Temperature	18.4 °C	Average Temperature	20.1 °C
Maximum Relative Humidity	70%	Maximum Relative Humidity	72%
Minimum Relative Humidity	68%	Minimum Relative Humidity	72%
Average Relative Humidity	69%	Average Relative Humidity	72%

Test Calculations
The STC (Sound Transmission Class), IIC (Impact Insulation Class), and ΔIIC (Delta Impact Insulation Class) ratings were calculated in accordance with ASTM E 413, ASTM E 989, ASTM E 2179, respectively.

Test Specimen Materials and Installation Details

Material	Dimensions (mm)	Thickness (mm)	Manufacturer and Series	Quantity	Average Weight
Ceramic Tile	304.8 by 304.8	7.0	N/A	10.98 m²	14.09 kg/m²
	Note: Grout was placed into the 6.35 mm joints between the ceramic tile and wiped clean. The ceramic tile was placed with light pressure onto a bed of mortar on the underlayment. The mortar was set using a 6.35 mm by 6.35 mm trowel. Both the grout and mortar were allowed to cure to manufacturer's specifications.				

Test Specimen Materials and Installation Details (Continued)

Material	Dimensions (mm)	Thickness (mm)	Manufacturer and Series	Quantity	Average Weight
Rubber Underlayment	3048 by 1219.2	3.0	Regupol Sonus	10.98 m²	2.49 kg/m²
	Note: Loose laid.				
Concrete slab	3023 by 3632	152.0	N/A	10.98 m²	366.18 kg/m²
	Note: The concrete slab was installed in a test frame flush to the source room.				

Comments

The total weight of the floor/ceiling assembly was 4202.7 kg. Architectural Testing will store samples of the test specimen for four years. Photographs of the test specimen are included in the attachments. A drawing of the test specimen is included in the attachments.

Architectural Testing will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC:

Digitally Signed by: Leeland Hoover

Leeland S. Hoover
Technician II - Acoustical Testing

Digitally Signed by: Bradlay Hunt

Bradlay D. Hunt
Project Manager - Acoustical Testing

Attachments (9)

** Stated by Client/Manufacturer*
N/A - Non Applicable

Revision Log

Revision	Date	Page(s)	Description
R0	01/05/15	N/A	Original Report Issue

Attachments

Instrumentation

Instrument	Manufacturer	Model	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-1033	63763	06/14 *
Source Room Microphone	PCB Piezotronics	378B20	63738	04/14
Source Room Microphone	PCB Piezotronics	378B20	63739	04/14
Source Room Microphone	PCB Piezotronics	378B20	63748	04/14
Source Room Microphone	PCB Piezotronics	378B20	63742	04/14
Source Room Microphone	PCB Piezotronics	378B20	63741	04/14
Receive Room Microphone	PCB Piezotronics	378B20	64340	04/14
Receive Room Microphone	PCB Piezotronics	378B20	63744	04/14
Receive Room Microphone	PCB Piezotronics	378B20	63745	04/14
Receive Room Microphone	PCB Piezotronics	378B20	63746	04/14
Receive Room Microphone	PCB Piezotronics	378B20	63747	04/14
Receive Room Environmental Indicator	Comet	T7510	63810	09/14
Receive Room Environmental Indicator	Comet	T7510	63811	09/14
Source Room Environmental Indicator	Comet	T7510	63812	09/14
Microphone Calibrator	Norsonic	1251	Y002919	06/14
Tapping Machine	Norsonic	N-211	Y003242	03/14

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

Test Chambers

VT Receive Room Volume	158.9 m^3
VT Source Room Volume	190 m^3

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AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover

Freq (Hz)	Background SPL (dB)	Absorption (m²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	66.0	13.8	104	65	39	4.30	-
100	43.4	12.3	102	62	40	2.50	-
125	38.4	8.8	108	71	39	2.10	0
160	38.6	8.8	101	66	36	2.00	4
200	31.9	11.3	98	63	35	1.50	8
250	30.8	9.7	99	58	43	0.90	3
315	27.3	8.7	99	56	45	1.90	4
400	25.1	7.8	97	52	46	1.00	6
500	25.8	7.2	99	49	53	1.00	0
630	25.2	6.7	100	45	58	0.80	0
800	24.6	6.8	100	41	63	0.50	0
1000	25.1	6.8	100	38	64	0.60	0
1250	22.9	6.8	100	37	66	0.30	0
1600	20.3	6.8	100	35	68	0.30	0
2000	13.5	7.5	100	35	68	0.30	0
2500	9.7	8.2	99	36	66	0.40	0
3150	8.1	8.8	99	32	69	0.50	0
4000	6.8	10.0	100	28	72	0.40	0
5000	6.2	11.7	100	25	75	0.50	-
6300	6.2	14.5	93	14	79	0.50	-
8000	6.5	19.1	92	10	81	0.70	-
10000	6.4	24.1	87	6	80	0.50	-

STC Rating **53** *(Sound Transmission Class)*

Deficiencies 25 *(Sum of Deficiencies)*

Notes: *1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*
2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

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AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover

Architectural Testing

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IMPACT SOUND TRANSMISSION

ASTM E 492

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover

Freq (Hz)	**Background SPL** (dB)	**Absorption** (m²)	**Normalized Impact SPL** (dB)	**95% Confidence Limit**	**Number of Deficiencies**
80	66.8	14.9	66	3.2	-
100	44.1	13.9	57	1.9	0
125	40.1	9.2	59	1.4	0
160	36.9	9.5	62	2.3	0
200	30.6	11.7	69	1.4	7
250	30.2	10.1	67	0.8	5
315	27.4	10.1	67	1.9	5
400	25.6	8.2	67	2.4	6
500	27.4	7.5	62	1.7	2
630	27.7	7.3	61	2.7	2
800	26.2	7.3	59	1.4	1
1000	30.3	7.3	56	2.5	0
1250	31.3	7.3	53	2.7	0
1600	26.4	7.3	49	2.5	0
2000	20.8	8.0	46	1.2	0
2500	16.2	8.9	43	1.0	0
3150	14.7	9.5	40	1.0	0
4000	11.7	10.8	36	1.3	-
5000	9.1	12.5	32	1.4	-
6300	7.4	15.7	25	1.0	-
8000	7.1	20.5	18	1.1	-
10000	6.8	25.7	12	1.1	-

IIC Rating **50** *(Impact Insulation Class)*

Deficiencies 28 *(Sum of Deficiencies)*

Note: *Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*

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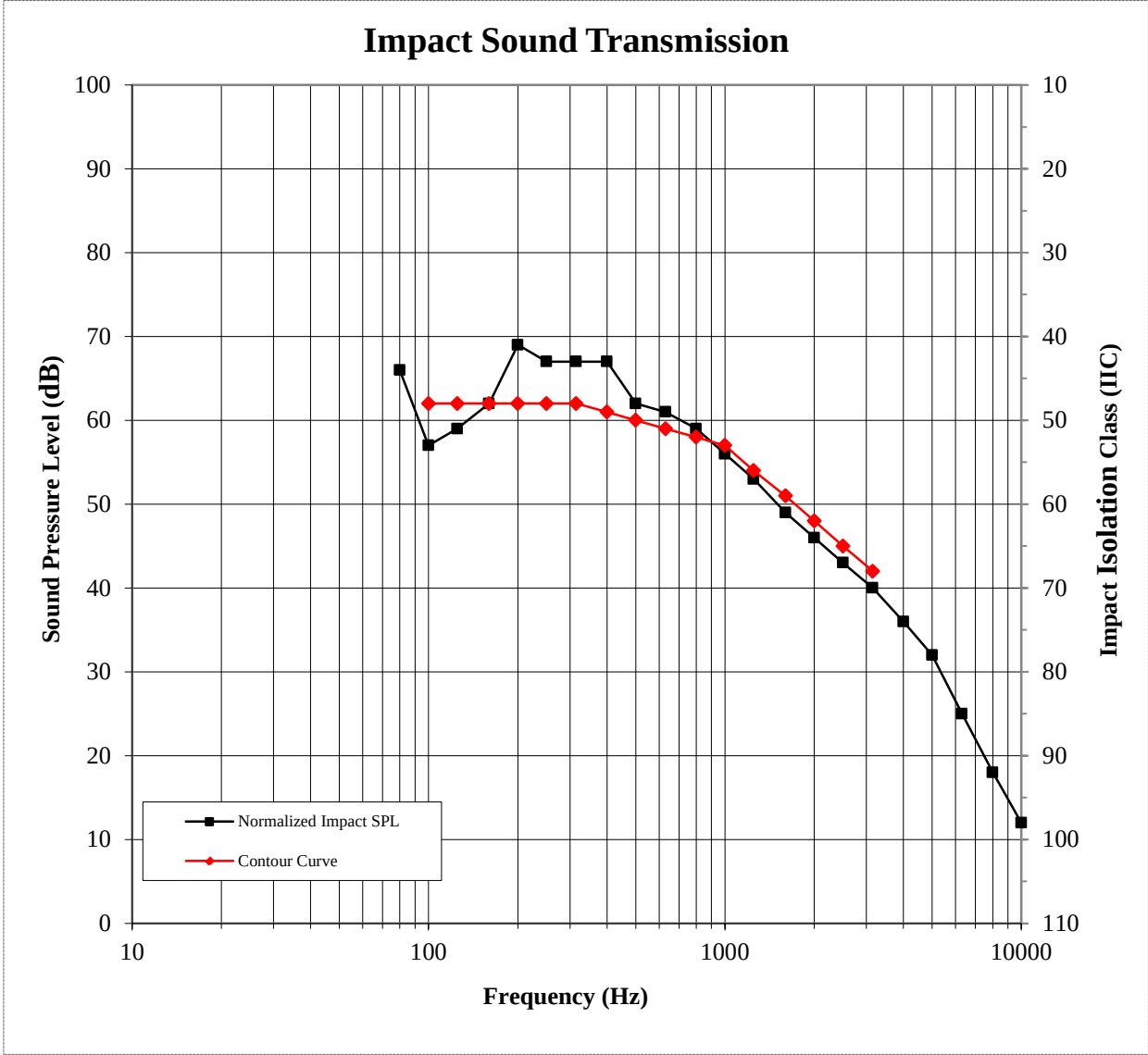
IMPACT SOUND TRANSMISSION

ASTM E 492

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover



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DELTA IMPACT INSULATION

ASTM E 2179

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover

Freq (Hz)	**Bkgrd SPL** (dB)	**Absorption** (Square Meters)	**Normalized Impact SPL** BARE (dB)	**95% Conf Limit**	**Normalized Impact SPL** SPEC (dB)	**95% Conf Limit**	**Resulting Array** $L_{ref,c}$	**No. of Deficiencies**
80	66.8	13.5	66.4	6.4	66.0	5.6	-	-
100	44.1	12.6	58.3	1.5	56.5	2.5	65	1
125	40.1	8.3	59.8	2.6	58.3	1.7	66	2
160	36.9	8.6	63.6	1.6	61.9	1.3	66	2
200	30.6	10.6	70.2	1.9	68.6	1.6	67	3
250	30.2	9.1	67.8	1.3	66.7	1.0	68	4
315	27.4	9.1	66.3	0.6	66.6	0.7	70	6
400	25.6	7.4	67.5	0.8	66.5	0.5	69	6
500	27.4	6.8	67.5	0.5	61.8	0.4	65	3
630	27.7	6.6	69.0	0.9	60.5	0.4	62	1
800	26.2	6.6	71.2	0.5	58.7	0.4	59	0
1000	30.3	6.6	71.9	0.4	55.7	0.4	56	0
1250	31.3	6.6	72.2	0.3	52.2	0.3	52	0
1600	26.4	6.6	72.9	0.5	49.0	0.4	48	0
2000	20.8	7.2	73.6	0.7	45.5	0.4	44	0
2500	16.2	8.0	73.7	0.8	43.0	0.4	41	0
3150	14.7	8.6	72.6	0.9	39.7	0.5	39	0
4000	11.7	9.7	71.1	1.0	35.8	0.4	-	-
5000	9.1	11.3	68.7	1.5	31.1	0.5	-	-
6300	7.4	14.3	64.5	1.9	25.0	0.5	-	-
8000	7.1	18.5	57.2	2.3	17.2	0.5	-	-
10000	6.8	23.3	49.8	2.7	11.4	0.6	-	-

ΔIIC Rating **20** *(Delta Impact Insulation Class)*

Deficiencies 28 *(Sum of Deficiencies)*

Note: *Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*

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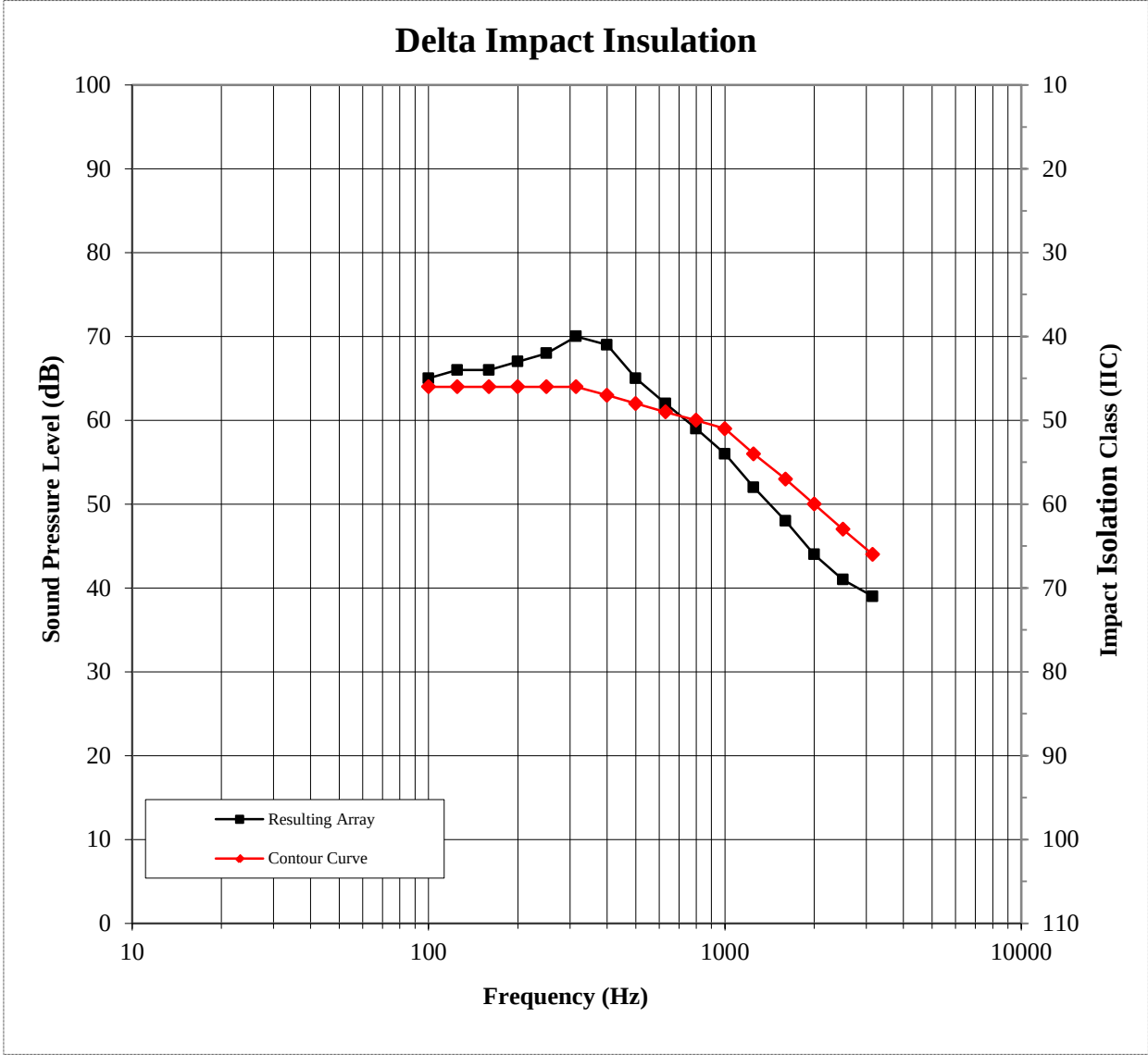
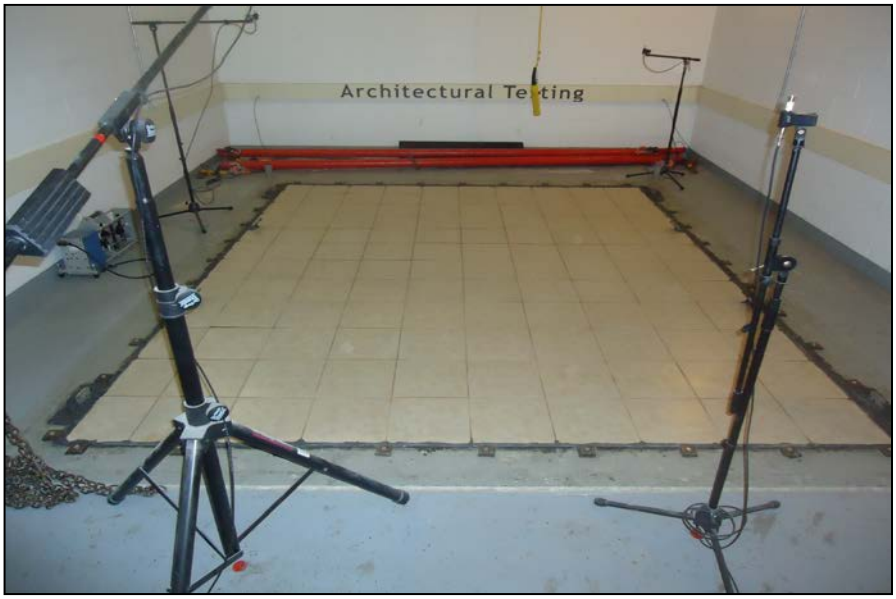
DELTA IMPACT INSULATION

ASTM E 2179

Test Date	09/26/14
Data File No.	E1551.01
Client	Regupol America
Description	7 mm Ceramic Tile, 3 mm Regupol Sonus Rubber Underlayment, 152 mm Concrete slab
Specimen Area	10.98 m²
Technician	Leeland S. Hoover



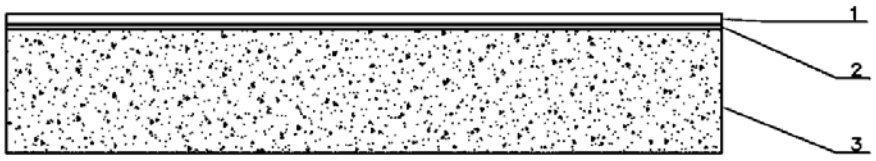
Photographs



Source Room View of Test Specimen Installation

Receive Room View of Test Specimen Installation

Drawing



1-Floor topping
2-Underlayment
3-Concrete Slab