

**C8707.02-113-11-R1**  
**ACOUSTICAL PERFORMANCE TEST REPORT**  
**ASTM E 90 AND ASTM E 492**

**Rendered to**

**ECORE International**

**Series/Model: QT4002**

**Specimen Type: Floor/Ceiling Assembly**

**Overall Size: 3023 mm by 3632 mm**

Summary of Test Results		
Data File	Result	Description (Nominal Dimensions)
C8707.01B	STC 54 IIC 50	2.5 mm Polyflor Expona Luxury Vinyl Tile, 2 mm ECORE International QT4002 Rubber Underlayment, 150 mm Concrete Slab

Reference should be made to Architectural Testing, Inc. Report C8707.02-113-11 for complete test specimen description.

## Acoustical Performance Test Report

ECORE International  
715 Fountain Avenue  
Lancaster, Pennsylvania 17601

<b>Report</b>	C8707.02-113-11
<b>Test Date</b>	06/06/13
<b>Report Date</b>	07/16/13
<b>Record Retention End Date</b>	07/16/17

### Project Scope

ECORE International contracted Architectural Testing to conduct airborne sound transmission loss and impact sound transmission 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 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 Vertical Transmission (VT) test chambers located in York, Pennsylvania. The microphones were calibrated before conducting the tests.

The sound transmission loss test was conducted in accordance with the ASTM E 90 test method using a single direction of measurement. Two background noise sound pressure level and fifty sound absorption measurements were conducted at each of the five microphone positions in the receiving (lower) room. Sound was generated in the source (upper) room, and two sound pressure level measurements were made simultaneously in both rooms, at each of the five microphone positions.

**Test Procedure (Continued)**

The impact sound transmission test was conducted in accordance with the ASTM E 492 test method. Two background noise sound pressure level and fifty sound absorption measurements were conducted at each of the five microphone positions in the receiving (lower) room. While the tapping machine was operating at each of the four locations on the floor surface, two sound pressure level measurements were made at each of five microphone positions in the receiving (lower) room.

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

**Test Conditions**

Source Room		Receive Room	
Maximum Temperature	24.7 °C	Maximum Temperature	21.6 °C
Minimum Temperature	24.6 °C	Minimum Temperature	21.6 °C
Maximum Relative Humidity	52.5 %	Maximum Relative Humidity	47.7 %
Minimum Relative Humidity	52.1 %	Minimum Relative Humidity	47.1 %

**Test Calculations**

The STC (Sound Transmission Class) rating was calculated in accordance with ASTM E 413. The IIC (Impact Insulation Class) rating was calculated in accordance with ASTM E 989.

**Test Specimen Construction**

The test specimen was constructed in the 3023 mm long by 3632 mm wide by 457 mm high opening. A drawing of the test specimen installation is included in the attachments.

A single layer of 0.05 mm polyethylene sheet was adhered to the concrete. The Gerbert 2525 flooring adhesive was troweled over the protective layer using a 1.5 mm by 1.5 mm by 1.5 mm square notch trowel. A single layer of the QT4002 rubber underlayment was placed on top of the Gerbert 2525 flooring adhesive within one hour of application. A 100-pound roller was used to evenly compress the underlayment into the adhesive.

The Gerbert 2525 flooring adhesive was troweled over the underlayment using a 1.5 mm by 1.5 mm by 1.5 mm square notch trowel. A single layer of the Polyflor Expona luxury vinyl tile was installed on top of the Gerbert 2525 flooring adhesive within one hour of application. A 100-pound roller was used to evenly compress the flooring into the adhesive. The perimeter of the flooring was sealed with duct seal.

### Test Specimen Materials

Material	Dimensions	Thickness	Manufacturer and Series	Quantity	Average Weight	Total Weight
Luxury Vinyl Tile	152 mm by 914 mm	2.51 mm	Polyflor Expona	10.98 m <sup>2</sup>	4.4 kg/m <sup>2</sup>	48.3 kg
Rubber Underlayment	3023 mm by 1219 mm	2.1 mm	ECORE International QT4002	10.98 m <sup>2</sup>	1.9 kg/m <sup>2</sup>	20.9 kg
Concrete Slab	3023 mm by 3632 mm	150 mm	N/A	10.98 m <sup>2</sup>	366.2 kg/m <sup>2</sup>	4020.9 kg

### Comments

The total weight of the floor/ceiling assembly was 4090.1 kg. Architectural Testing will store samples of the test specimen for four years. Photographs of the test specimen are included in the attachments. The design drawings, included in the attachments, accurately describe the test specimen.

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:

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Bradlay D. Hunt  
Project Manager - Acoustical Testing

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Todd D. Kister  
Laboratory Supervisor - Acoustical Testing

Attachments (7)

*\* Stated by Client/Manufacturer*

*N/A - Non Applicable*

### Revision Log

<b><u>Revision</u></b>	<b><u>Date</u></b>	<b><u>Page(s)</u></b>	<b><u>Description</u></b>
R0	07/16/13	N/A	Original Report Issue
R1	09/23/13	Cover Page	Nominal thickness changed to 2.5 mm

## Attachments

### Instrumentation

Instrument	Manufacturer	Model	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-1033	63763	06/12 *
Source Room Microphone	PCB Piezotronics	378B20	63738	04/13
Source Room Microphone	PCB Piezotronics	378B20	63739	04/13
Source Room Microphone	PCB Piezotronics	378B20	63740	04/13
Source Room Microphone	PCB Piezotronics	378B20	63741	04/13
Source Room Microphone	PCB Piezotronics	378B20	63742	04/13
Receive Room Microphone	PCB Piezotronics	378B20	63748	04/13
Receive Room Microphone	PCB Piezotronics	378B20	63744	04/13
Receive Room Microphone	PCB Piezotronics	378B20	63745	04/13
Receive Room Microphone	PCB Piezotronics	378B20	63746	04/13
Receive Room Microphone	PCB Piezotronics	378B20	63747	04/13
Receive Room Environmental Indicator	Comet	T7510	63810	09/12
Receive Room Environmental Indicator	Comet	T7510	63811	09/12
Source Room Environmental Indicator	Comet	T7510	63812	09/12
Microphone Calibrator	Cirrus Research (HP)	CRL 511E	Y001777	06/13
Tapping Machine	Norsonic	N-211	Y003242	03/13

### Test Chambers

VT Receive Room Volume	158.9 m <sup>3</sup>
VT Source Room Volume	190 m <sup>3</sup>

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

## SOUND TRANSMISSION LOSS

ASTM E 90

<b>Test Date</b>	06/06/13
<b>Data File No.</b>	C8707.01B
<b>Client</b>	ECORE International
<b>Description</b>	2.5 mm Polyflor Expona Luxury Vinyl Tile, 2 mm Ecore International QT4002 Rubber Underlayment, 150 mm Concrete Slab
<b>Specimen Area</b>	10.98 m <sup>2</sup>
<b>Technician</b>	Bradley D. Hunt

<b>Test Chamber</b>	VT Source Room	VT Receive Room
<b>Temperature</b>	24.7 °C	21.6 °C
<b>Humidity</b>	52.3 %	47.4 %

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
50	42.3	23.2	104	61	40	7.0	-
63	50.0	27.0	107	67	37	8.9	-
80	62.4	16.0	111	69	41	7.2	-
100	43.6	11.0	108	70	40	5.4	-
125	40.9	9.1	107	68	41	2.3	0
160	34.8	8.9	104	66	40	2.7	1
200	27.8	10.2	106	68	39	3.9	5
250	29.1	9.6	107	65	43	2.4	4
315	29.4	8.6	106	61	46	1.7	4
400	25.1	7.5	107	60	48	2.1	5
500	25.2	6.8	107	58	51	0.8	3
630	26.4	6.9	106	57	52	1.1	3
800	26.9	6.9	106	57	52	1.6	4
1000	24.4	6.9	107	54	55	1.2	2
1250	24.9	7.1	107	51	58	0.6	0
1600	23.2	7.2	107	47	63	0.5	0
2000	17.8	7.9	106	43	66	0.7	0
2500	12.7	8.9	105	39	69	0.9	0
3150	10.7	9.8	105	34	72	0.6	0
4000	8.7	11.1	103	31	72	0.7	0
5000	7.1	13.0	100	25	74	0.9	-
6300	6.7	16.9	95	16	78	1.2	-
8000	6.6	22.8	91	8	81	0.8	-
10000	6.5	30.0	85	5	77	0.7	-

**STC Rating**      **54**      (*Sound Transmission Class*)

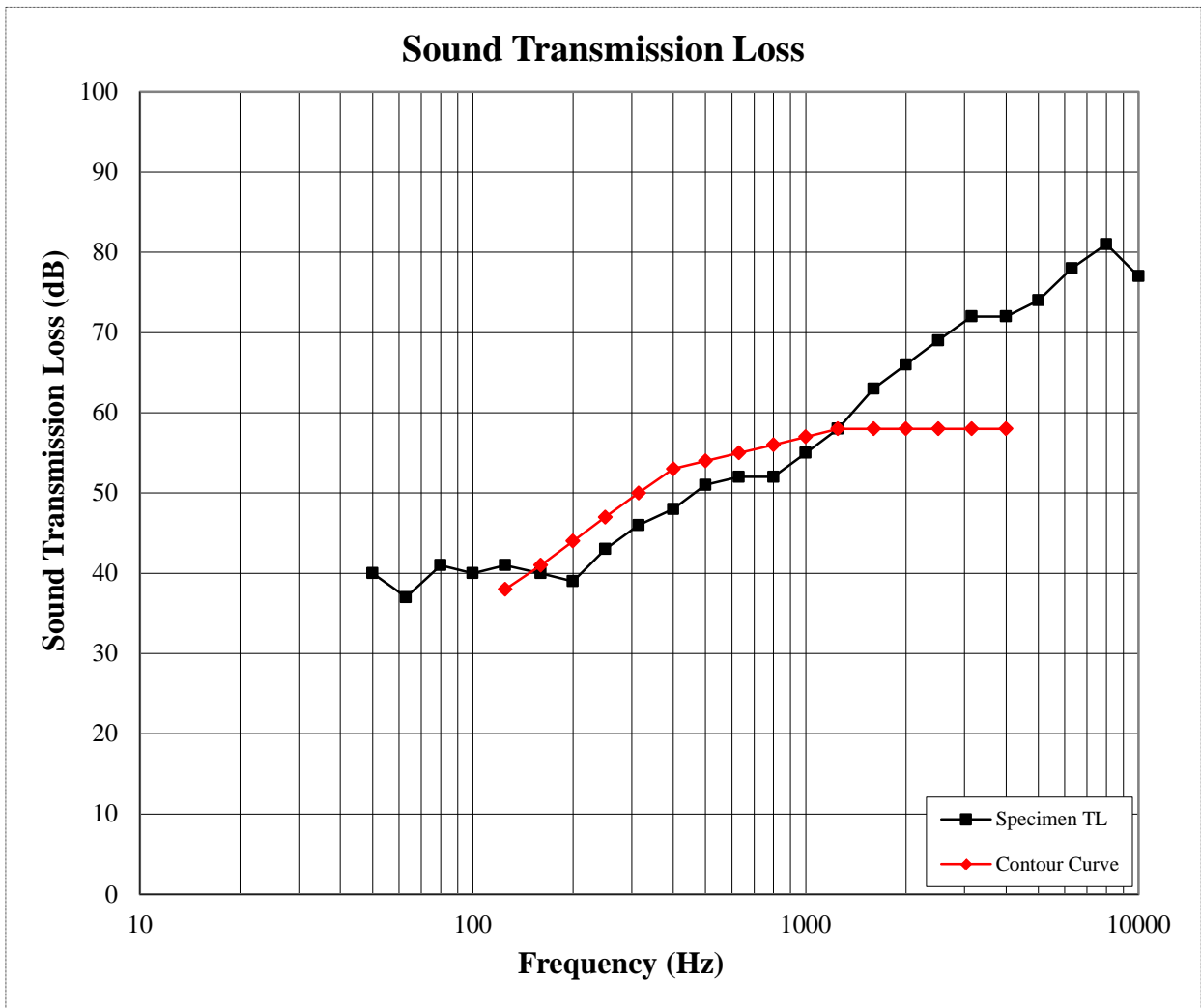
**Deficiencies**      **31**      (*Sum of Deficiencies*)

- 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

**SOUND TRANSMISSION LOSS**  
ASTM E 90

<b>Test Date</b>	06/06/13
<b>Data File No.</b>	C8707.01B
<b>Client</b>	ECORE International
<b>Description</b>	2.5 mm Polyflor Expona Luxury Vinyl Tile, 2 mm Ecore International QT4002 Rubber Underlayment, 150 mm Concrete Slab
<b>Specimen Area</b>	10.98 m <sup>2</sup>
<b>Technician</b>	Bradley D. Hunt

<b>Test Chamber</b>	VT Source Room	VT Receive Room
<b>Temperature</b>	24.7 °C	21.6 °C
<b>Humidity</b>	52.3 %	47.4 %





## IMPACT TRANSMISSION

ASTM E 492

<b>Test Date</b>	06/06/13
<b>Data File No.</b>	C8707.01B
<b>Client</b>	ECORE International
<b>Description</b>	2.5 mm Polyflor Expona Luxury Vinyl Tile, 2 mm E CORE International QT4002 Rubber Underlayment, 150 mm Concrete Slab
<b>Specimen Area</b>	10.98 m <sup>2</sup>
<b>Technician</b>	Bradlay D. Hunt

<b>Test Chamber</b>	VT Receive Room
<b>Temperature</b>	21.6 °C
<b>Humidity</b>	47.4 %

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Normalized Impact SPL (dB)	95% Confidence Limit	Number of Deficiencies
50	39.7	23.2	55	3.6	-
63	49.4	29.7	56	3.7	-
80	61.9	16.0	62	3.3	-
100	41.2	11.3	56	2.4	0
125	39.8	9.2	59	2.5	0
160	32.7	9.0	62	1.7	0
200	28.8	10.2	68	2.6	6
250	29.6	9.6	64	1.4	2
315	27.1	8.6	65	2.4	3
400	25.1	7.5	64	1.7	3
500	24.5	6.8	62	1.8	2
630	25.4	6.9	61	1.6	2
800	31.3	6.9	61	5.2	3
1000	29.8	6.9	58	4.0	1
1250	27.0	7.1	55	6.7	1
1600	23.2	7.2	51	7.6	0
2000	18.9	7.9	45	12.6	0
2500	15.0	8.9	38	10.5	0
3150	14.2	9.7	33	10.3	0
4000	11.8	11.1	27	10.8	-
5000	10.4	13.0	20	7.4	-
6300	10.0	16.9	15	4.3	-
8000	8.3	22.7	11	1.2	-
10000	7.4	29.7	11	0.4	-

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

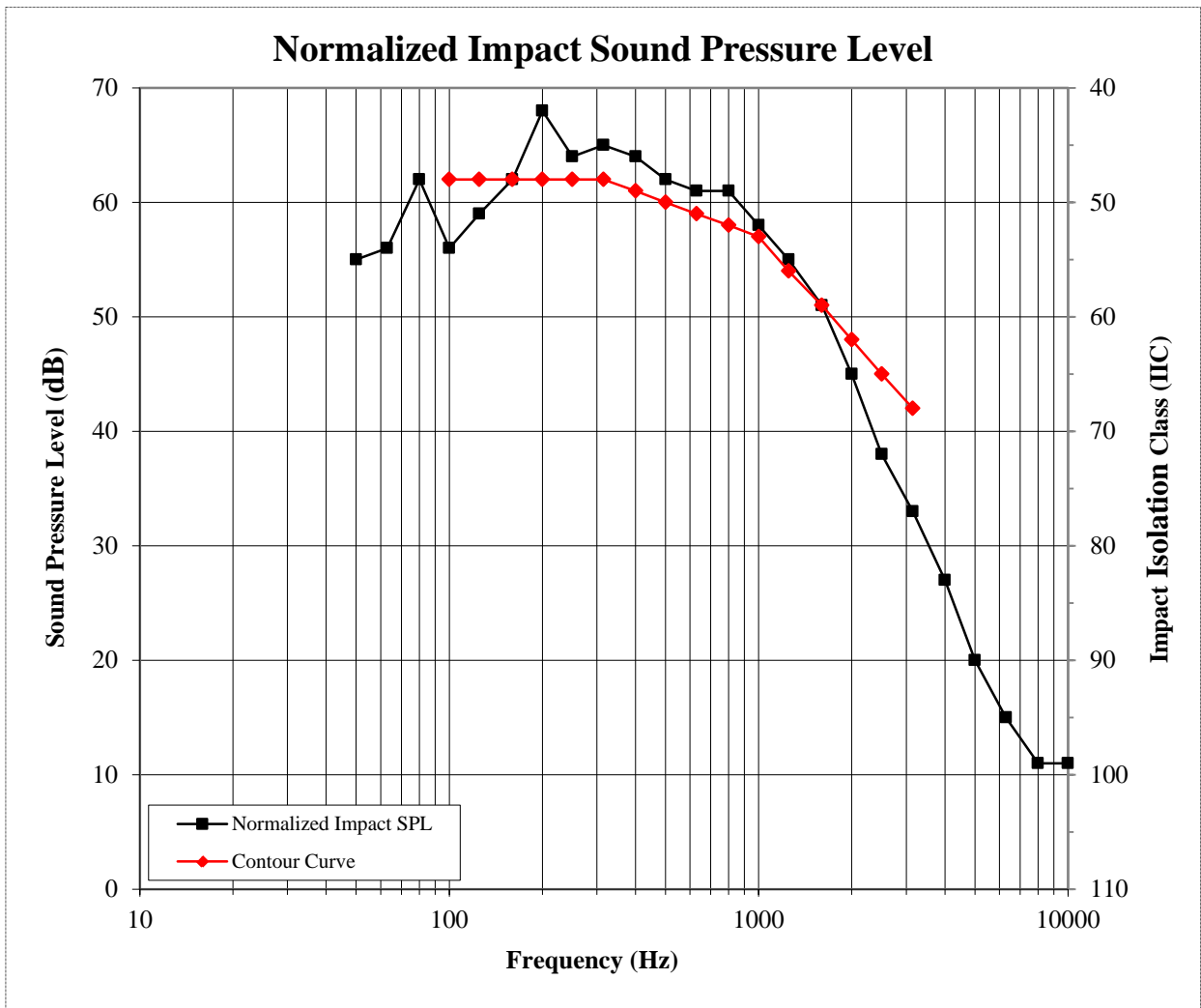
**Deficiencies**      23      (*Sum of Deficiencies*)

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

**IMPACT TRANSMISSION**  
 ASTM E 492

<b>Test Date</b>	06/06/13
<b>Data File No.</b>	C8707.01B
<b>Client</b>	ECORE International
<b>Description</b>	2.5 mm Polyflor Expona Luxury Vinyl Tile, 2 mm ECORE International QT4002 Rubber Underlayment, 150 mm Concrete Slab
<b>Specimen Area</b>	10.98 m <sup>2</sup>
<b>Technician</b>	Bradlay D. Hunt

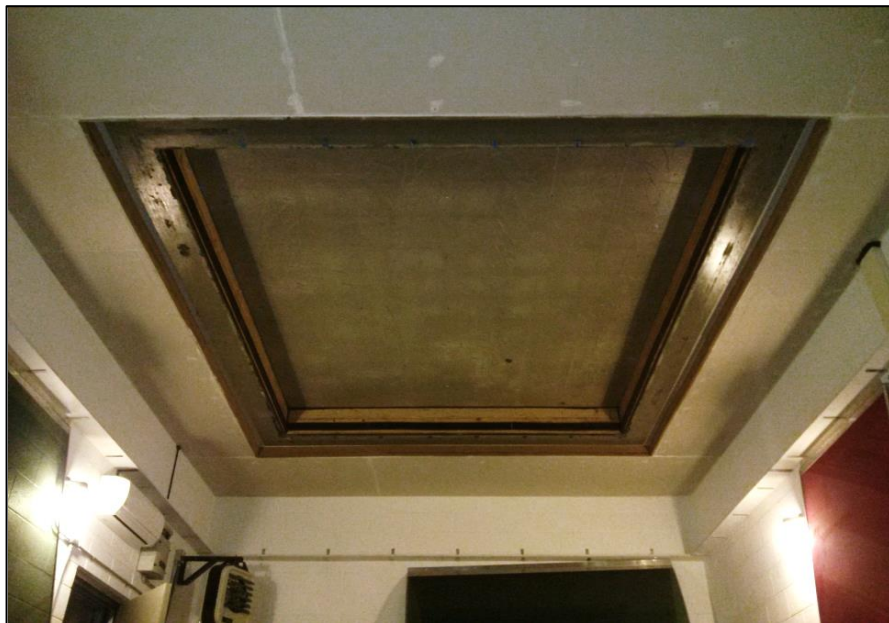
<b>Test Chamber</b>	VT Receive Room
<b>Temperature</b>	21.6 °C
<b>Humidity</b>	47.4 %



**Photographs**



**Source Room View of Test Specimen Installation**

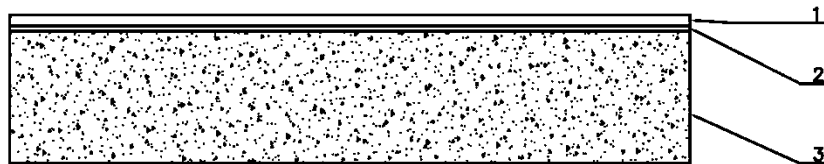


**Receive Room View of Test Specimen Installation**

## Drawings



**Test Specimen Installation**



**Cross Section View of Test Specimen**