VULCRAFT/VERCO GROUP
ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK
ASTM E90 AND ASTM E492 TESTING ON
CERAMIC TILE OVER 5 MM ECOSILENCE UNDERLAYMENT

SPECIMEN TYPE
Vulcraft 20 Gage Dove Tail 2.00 Steel Deck

REPORT NUMBER
H7786.06-113-11-R2

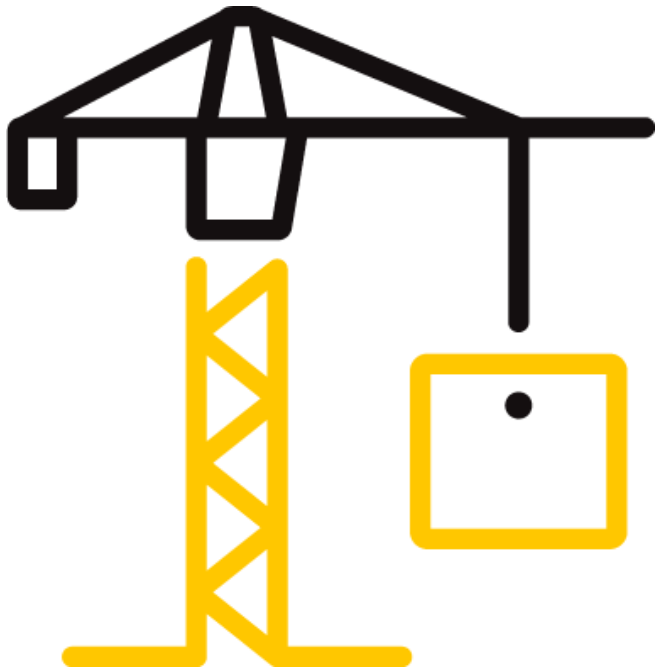
TEST DATE
02/12/18

ISSUE DATE **REVISED DATE**
03/22/18 08/10/18

RECORD RETENTION END
02/12/22

PAGES
13

DOCUMENT CONTROL
ATI 00629 (09/19/17)
RTTDS-R-AMER-Test-2844



130 Derry Court
York, PA 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
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TEST REPORT FOR VULCRAFT/VERCO GROUP
Report No.: H7786.06-113-11-R2
Date: 08/10/18

REPORT ISSUED TO
VULCRAFT/VERCO GROUP
7205 Gault Avenue North
Fort Payne, Alabama 35967

SECTION 1
SCOPE

Intertek Building & Construction (B&C) was contracted by to perform testing in accordance with ASTM E90 AND ASTM E492 on Ceramic Tile over 5 mm ECOsilence Underlayment. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted in the VT test chambers at Intertek B&C located in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2
SUMMARY OF TEST RESULTS

DATA FILE NO.	H7786.06
SERIES/MODEL:	Ceramic Tile over 5 mm ECOsilence Underlayment
STC	51
IIC	41

COMPLETED BY:	Daniel B. Mohler	**COMPLETED BY:**	Jordan Strybos
TITLE:	Project Lead - Acoustical Testing	**TITLE:**	Project Manager - Acoustical Testing
SIGNATURE:	Digitally Signed for: Daniel Mohler by Janine Sobell	**SIGNATURE:**	Digitally Signed by: Jordan Strybos
DATE:	08/10/18	**DATE:**	08/10/18

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SECTION 3
TEST METHODS

The specimen was evaluated in accordance with the following:

ASTM E90-09 (2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E492-09(2016)e1, *Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine*

ASTM E989-06 (2012), *Classification for Determination of Impact Insulation Class (IIC)*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

SECTION 4
MATERIAL SOURCE/INSTALLATION

The full test specimen was assembled on the day of testing by B&C. All materials provided by the client were installed on an existing B&C assembly (Vulcraft 20 Gage Dove Tail 2.00 Steel Deck) utilizing B&C-supplied materials. The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with dense neoprene gasket.

The total weight of the floor/ceiling assembly was 3074.7 kg. B&C 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.

B&C 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 B&C for the entire test record retention period.

130 Derry Court
York, PA 17406

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SECTION 5
EQUIPMENT

INSTRUMENT	MANUFACTURER	MODEL	DESCRIPTION	ASSET #	CAL DATE	
Data Acquisition Unit	National Instruments	PXI-1033	Data Acquisition Card	63763-1	06/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Input Card	63763-4	07/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Input Card	63763-5	06/16	*
Microphone Calibrator	Norsonic	1251	Pistonphone calibrator	INT00127	03/17	
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65617	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63744	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63745	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63746	09/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63747	05/17	
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/17	
				63811	10/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63738	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63739	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63740	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63742	04/17	
Source Room Microphone	PCB Electronics	378B20	Microphone and Preamplifier	63741	04/17	
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	INT00603	03/17	
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	12/17	

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

VT RECEIVE ROOM VOLUME	158.99 m^3
VT SOURCE ROOM VOLUME	190 m^3

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Daniel B. Mohler	Intertek B&C
Jordan Strybos	Intertek B&C

130 Derry Court
York, PA 17406

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SECTION 7
TEST PROCEDURE

The microphones were calibrated before conducting the tests. The air temperature and relative humidity conditions were monitored and recorded during all measurements.

The airborne transmission loss test was conducted in accordance with the ASTM E90 test method using the single direction method. Two background noise sound pressure level and five sound absorption measurements were conducted at each of five microphone positions. 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 E492 test method. Two background noise sound pressure level, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E492, and five sound absorption measurements were conducted at each of five microphone positions.

Detailed test procedures, data for flanking limit tests, repeatability measurements, and reference specimen tests are available upon request.

SECTION 8
TEST CALCULATIONS

The STC (Sound Transmission Class) and IIC (Impact Insulation Class) ratings were calculated in accordance with ASTM E413 and ASTM E989, respectively.

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SECTION 9
TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm/inch)	THICKNESS (mm/inch)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Ceramic Tile	304.8 by 304.8	8.5	Daltile	10.98 m²	15.72 kg/m²
	Note: Laticrete Permacolor grout was placed into the 6.35 mm joints between the porcelain tile and wiped clean. The ceramic tile was placed with light pressure onto a bed of Laticrete Platinum 254 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.				
Rubber Underlayment	3023 by 1219	5.0	ECOsilence	10.98 m²	4.2 kg/m²
	Note: A sheet of 2 mil polyethylene plastic was adhered to the floor slab with 3M Super 77 spray adhesive. The underlayment was adhered to the sheeting with ECORE™ EGrip™ III adhesive, which was spread using a 0.79 mm by 1.59 mm by 0.79 mm trowel. Adhesive was allowed to cure per manufacturer's specifications.				
Standard 4000 PSI Concrete	3023 by 3632	139.7	N/A	10.98 m²	248.08 kg/m²
	Note: Poured directly on the floor deck and allowed to cure for a minimum of 28 days.				
Steel Deck	3023 by 609.6	139.7	20 Gage Vulcraft Dove Tail 2.00	10.98 m²	12.01 kg/m²
	Note: Installed per manufacturer's specifications in a test frame with the top of the concrete flush with the source room. All seams and gaps underneath the deck were plugged with backer rod and sealed with Pecora AC-20 Acoustical Sealant.				

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Date: 08/10/18

SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS

ACCREDITED Testing Laboratory

TEST DATE	2/12/2018				
DATA FILE NO.	H7786.06				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail 2.00 Steel Deck				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	17.6°C	**Source Temp.**	18.9°C
TECHNICIAN	ZPG	**Receive Humidity**	60%	**Source Humidity**	60%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	38.7	17.0	110	68	40	3.8	-
100	30.7	14.3	106	66	39	3.0	-
125	30.0	10.8	105	67	38	1.3	0
160	29.5	11.1	107	69	38	0.9	0
200	23.6	11.4	105	68	37	1.9	4
250	23.0	11.7	104	64	39	1.1	5
315	24.4	11.3	105	61	44	1.0	3
400	21.6	8.5	104	57	48	0.6	2
500	22.4	8.5	103	56	48	0.5	3
630	24.4	8.2	104	61	44	0.7	8
800	23.6	7.5	103	55	51	0.5	2
1000	21.6	7.6	104	51	54	0.6	0
1250	18.3	7.8	103	50	54	0.5	1
1600	14.6	7.7	103	46	58	0.4	0
2000	10.0	8.6	103	44	61	0.4	0
2500	6.5	9.8	102	39	63	0.4	0
3150	5.5	10.8	103	34	69	0.4	0
4000	5.3	12.8	104	32	71	0.4	0
5000	5.4	15.6	104	30	73	0.5	-
6300	6.0	20.3	98	18	76	0.7	-
8000	6.5	26.9	97	14	79	0.9	-
10000	6.6	34.3	93	8	80	0.9	-
STC Rating	**51**	*(Sound Transmission Class)*			**Sum of Deficiencies**		**28**

Notes:

1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.
2) Specimen TL levels listed in red are potentially limited by the laboratory flanking limit.
3) Specimen TL levels listed in blue indicate the lower limit of the transmission loss.
4) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

130 Derry Court
York, PA 17406

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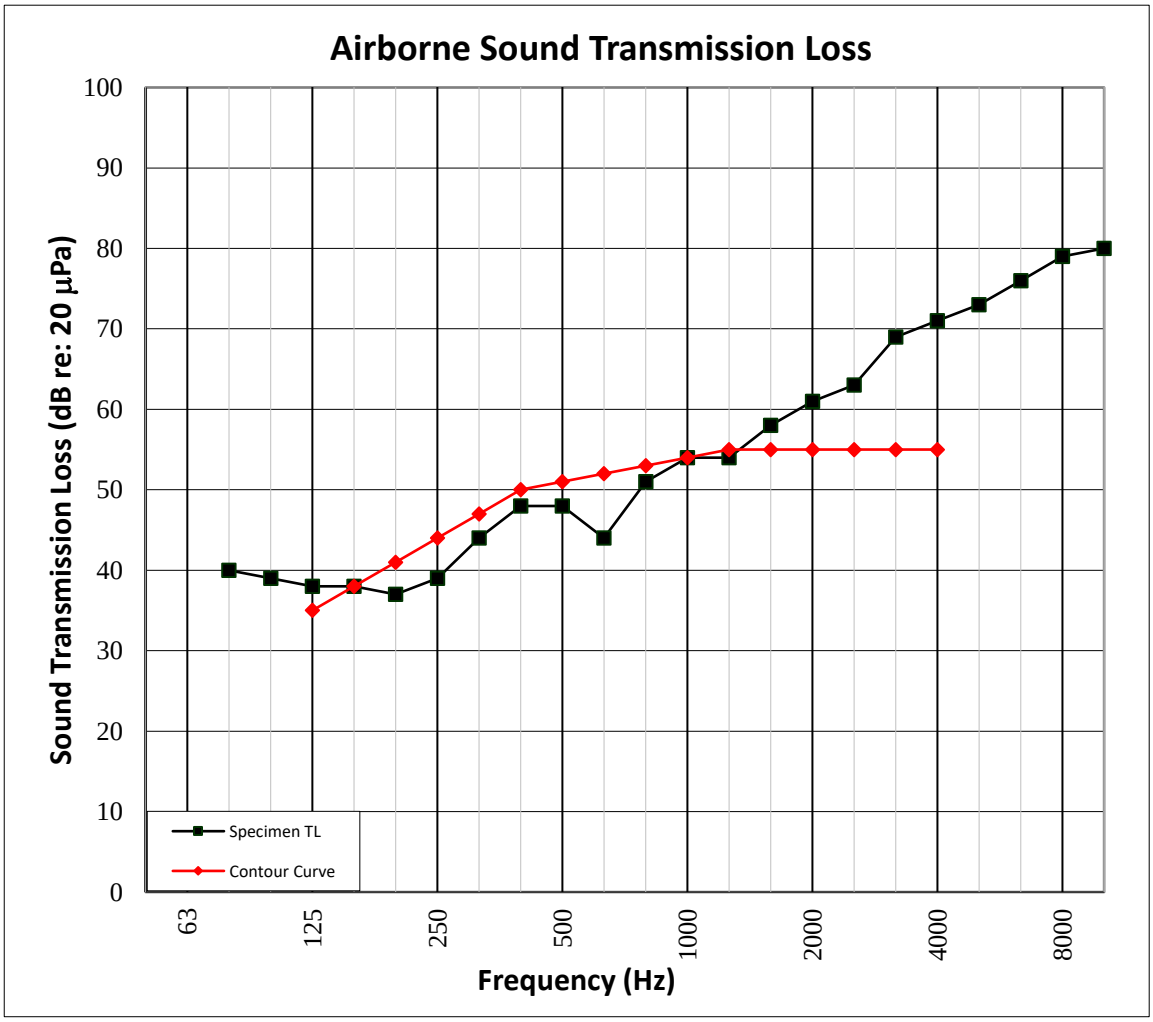
Date: 08/10/18

SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH

ACCREDITED Testing Laboratory

TEST DATE	2/12/2018				
DATA FILE NO.	H7786.06				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail 2.00 Steel Deck				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	17.6°C	**Source Temp.**	18.9°C
TECHNICIAN	ZPG	**Receive Humidity**	60%	**Source Humidity**	60%



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Facsimile: 717-764-4129
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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION

ACCREDITED Testing Laboratory

TEST DATE	2/12/2018				
DATA FILE NO.	H7786.06				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail 2.00 Steel Deck				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	17.8°C	**Minimum Temp.**	17.4°C
TECHNICIAN	ZPG	**Max. Humidity**	60%	**Min. Humidity**	60%

FREQ (Hz)	**BACKGROUND SPL** (dB)	**ABSORPTION** m²	**NORMALIZED IMPACT SPL** (dB)	**95% CONFIDENCE LIMIT**	**NUMBER OF DEFICIENCIES**
80	38.3	17.5	57	2.0	-
100	30.1	13.8	58	1.2	0
125	29.6	10.5	57	1.2	0
160	28.2	11.7	65	1.1	0
200	24.2	11.8	68	0.7	0
250	23.5	11.3	69	0.7	0
315	24.2	10.7	71	0.5	0
400	20.9	8.6	68	0.3	0
500	22.2	8.4	72	0.5	3
630	23.8	8.3	76	0.3	8
800	23.6	7.4	72	0.4	5
1000	23.1	7.5	66	0.5	0
1250	20.0	7.8	61	0.5	0
1600	15.7	7.8	57	0.2	0
2000	10.9	8.6	54	0.4	0
2500	6.6	9.8	51	0.3	0
3150	5.4	10.8	46	0.3	0
4000	5.3	12.8	43	0.4	-
5000	5.4	15.6	43	0.5	-
6300	6.0	20.0	37	0.5	-
8000	6.4	26.6	35	0.4	-
10000	6.6	33.9	35	0.6	-
IIC Rating	**41**	*(Impact Insulation Class)*		**Sum of Deficiencies**	**16**

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

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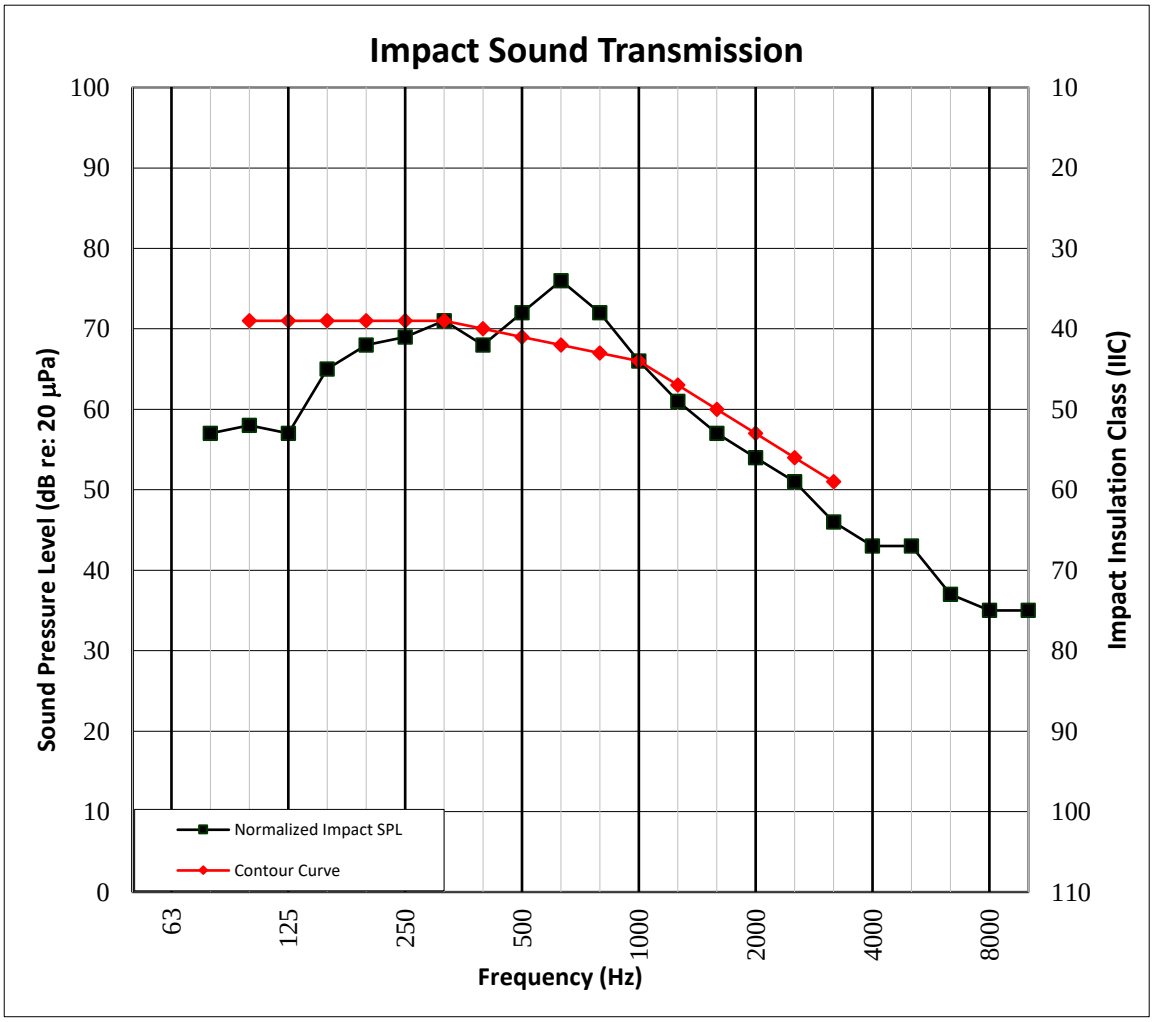
SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH

ACCREDITED Testing Laboratory

TEST DATE	2/12/2018				
DATA FILE NO.	H7786.06				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail 2.00 Steel Deck				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	17.8°C	**Minimum Temp.**	17.4°C
TECHNICIAN	ZPG	**Max. Humidity**	60%	**Min. Humidity**	60%



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Facsimile: 717-764-4129
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SECTION 14
PHOTOGRAPHS

Photo No. 1
Source Room View of Test Specimen Installation

Photo No. 2
Receive Room View of Test Specimen Installation

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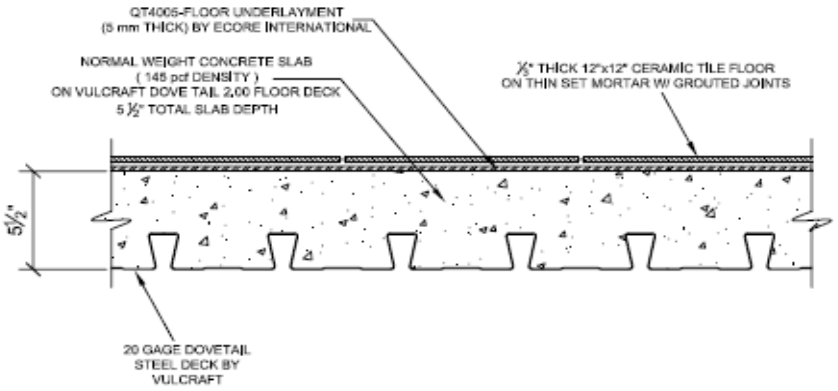
SECTION 15
DRAWING



Drawing of Test Specimen (supplied by Client)

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Facsimile: 717-764-4129
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SECTION 16
REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	03/22/18	N/A	Original Report Issue
R1	04/04/18	1, 6-10, 12	Steel deck name adjusted and drawing updated per client's request
R2	08/10/18	All pages	Dataset number corrected, specimen type corrected