

West and Associates Pty. Ltd.

ACOUSTIC AND AIRCONDITIONING ENGINEERS

ABN 12 003 731 851

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**Total number of pages
including this page:.6+Att**

Date: 17 July 2019

To: Owner Unit 201
126 Jean Wailes Ave., RHODES NSW 2137
C/- VPI Group

Attn: Carie H

Email: [\[carie.h@vpigroup.com.au\]](mailto:carie.h@vpigroup.com.au)

From: Warwick West

Job No. 2213/6

SUBJECT UNIT 201(LEVEL 2) TO UNIT 101(LEVEL 1), 12 JEAN WAILES AVE. RHODES, SP81356, SAMPLE FIELD FLOOR IMPACT INSULATION TEST REPORT

I. SITE DETAILS GENERALLY



Our Client The Owner of Unit 201 engaged the services of West and Associates Pty Ltd through Carrie H. of the VPI Group, Property Managers to measure the sample floor impact sound insulation performance between Unit No. 201, source room (Level 2 Lounge Room) and Unit 101 receiver room (Level 1 Lounge Room) in the building; 12 Jeans Wailes Ave. Rhodes being part of the Smart Bates Complex (SP81356) using a floor covering of selected timber board over selected acoustic underlay.

The aim of the tests were to measure resulting floor impact insulation performance of the sample floor coverings and compare the results with the current Strata By-Law requirements. A photo of the building where the tests were carried out is shown opposite.

Photo of south facade of the building-12-Jean Wailes Ave. RHODES..

II. CURRENT CRITERIA FOR FLOOR IMPACT PERFORMANCE

A. HARD FLOOR CHANGE BY-LAWS

The relevant current By-Laws relating to floor covering changes at this building SP81356 is Special By-Law 3 issued on 01/03/2018, which states the following:

“PART D TERMS

Hard surface flooring may not be installed unless the flooring system has a floor impact insulation performance rating ($L'nT,w$) less than or equal to 47 (ie. $L'nT,w \leq 47$) when measured in situ according with the Australian Standard AS/ISO 140.7

PART E TERMS AND CONDITIONS; Item 1(b):

Provide evidence in the form of a signed report from a qualified Acoustic Consultant that the flooring has been designed by an Acoustic Consultant and the flooring system when installed has a floor impact insulation performance rating ($L'nT,w$) less than or equal to 47 (ie. $L'nT,w \leq 47$).

We note the smaller the $L'nT,w$ value, the better the impact insulation performance.

III. FLOOR IMPACT INSULATION PERFORMANCE TESTING

The Client required sample floor impact insulation performance tests to be carried out between Lounge Room of Unit 201 on level 2 (source room) and Lounge Room of Unit 101 Lounge room level 1 (receiving room).

Details of the test are as follows:

- The impact floor tests were carried out on 17/07/2019 with tapping machine approximately 1.5 metre from the walls in the source room.
- The layout of source Unit was the same as the receiver Unit.
- Carpet and rubber underlay was laid on the floor of the source room and was rolled up to leave exposed concrete floor in the source room for the test. Carpet was laid on the floor of the receiving room.
- The sample floor tested was both loose lay hybrid timber planks and loose lay laminated timber planks over different underlays as shown in the Table below.
- The airborne sound measurements of the tapping machine for the one locations in the source room were taken at the four locations in the receiver room
- Background noise level and reverberation time were measured in 3 locations each in the receiver room.
- Airborne sound transmission between source and receiver rooms were not measured between these Units but the construction for these units are typical for the Smart bates complex and another airborne sound insulation test in close by units to verify airborne sound insulation integrity between the units

A summary of the materials tested is shown in the table below. Details of the test, the results of the tests and our assessment of the results are detailed in the following sections.

Table 1. Table of Sample Underlay and Floor Coverings Tested

Test ID	ID Name	Test Location.	Underlay.	Hard Floor Covering
#1	6.5 mm Hybrid Laminate Timber	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	Inbuilt rubber	6.5 mm Hybrid Homestead Laminated Timber floor
#2	7 mm Hybrid Laminate Timber	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	Inbuilt rubber	7.0 mm Hybrid Top Deck Laminated Timber floor
#3	14 mm Laminate Timber over 5 mm LAMILAY Superfelt	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	4 mm LAMILAY Superfelt	14 mm Laminated Timber floor
#4	14 mm Laminate Timber over 5 mm REGUPOL 5520	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	5 mm REGUPOL 5520	14 mm Laminated Timber floor
#5	6.5 mm Hybrid Laminate Timber over 5 mm REGUPOL 5520	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	Inbuilt rubber plus 5 mm REGUPOL 5520	6.5 mm hybrid Homestead Laminated Timber floor

IV. TEST INSTRUMENTATION

A. NOISE MEASUREMENT INSTRUMENTATION

Instrumentation used to measure noise in this report was a SVAN (Type 1) Sound Analyzer Model 945A with one third octave band Filter Serial No 9418 with 40AN (Type 1) Microphone Serial No 16960. The results were recorded within the instrument for each measurement and these results used to calculate the single number figures and to plot the results.

Complying field calibration checks for the instrument were carried out immediately before and after the tests using a Acoustic Calibrator Type Rion NC 73 Serial No. 11127967. All instruments hold current NATA calibration certificates and the measurement instruments are in accordance with the requirements of AS 1259.2, Sound Level Meters, Integrating and Averaging.

B. IMPACT TEST TAPPING MACHINE

Impact sound in the source room was generated using a BSWA-TEC standardized tapping machine, Model No TM002, Serial No. 1Z17, manufactured in accordance with the requirements of AS/ISO 140, BS5821, EN 20140, ASTM E492, GB J75-84.



The tapping machine used has a rotating cam allowing five, 500 gram hammer heads to be raised, then dropped under gravity through 40 mm, at a rate of 10 impact per second.

Photo of the tapping machine in Source Room

V. SITE TESTING

A. FIELD FLOOR IMPACT SOUND INSULATION TEST RESULTS

The floor impact tests were carried out according to AS/ISO 117.2-2004 and reported according to AS/ISO 140.7-2006.

Field airborne sound insulation between the source and receiver rooms was also checked which verified flanking airborne noise between the rooms did not interfere with or adversely affect the field floor impact testing results.

The details of the floor impact test results are set out in the Appendices 1-5. Test Sheet titled "Field measurements of impact sound insulation of floors". Our summary of the results, the Building Requirement and Compliance are shown in the following table:

Table 2 Field Floor Impact Insulation Sample Test Results

Test ID	ID Name	Source/ Receiver Units.	Measured L'nT,w	Building Req' L'nT,w	Complies with Impact Criteria
#1	6.5 mm Hybrid Laminate Timber	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	45 L'nTw	47	Yes

#2	7 mm Hybrid Laminate Timber	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	45 L'nTw	47	Yes
#3	14 mm Laminate Timber over 5 mm LAMILAY Superfelt	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	47 L'nTw	47	Marginal, Not recommended
#4	14 mm Laminate Timber over 5 mm REGUPOL 5520	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	47 L'nTw	47	Marginal, Not recommended
#5	6.5 mm Hybrid Laminate Timber over 5 mm REGUPOL 5520	Unit 201; source room (Level 2 Lounge room) to Unit 101; receiver room (Level 1 Lounge room)	44 L'nTw	47	Yes

VI. COMPLIANCE RECOMMENDATIONS

The sample floor impact test of the loose lay 6.5 and the 7mm hybrid laminated timber with inbuilt underlay by themselves and with the 5mm REGUPOL 5520 underlay tested in the Lounge Room of Unit 201 all complied with the current By-law requirements.

In the case with Test#3 & #4 using the laminated timber with two different underlays just equaled the building by-law requirement of LnTw 47. We find that test results of a finished floor can test either the same as a sample test but on some occasions, sometimes worse. There is no factor of safety with the use of these two alternative materials so we do not recommend these arrangements to be used.

We would expect that if the floor is laid strictly according to the manufacturer's recommendation, the impact performance of an as-installed floor would perform at approximately the same level. Some times in practice, an as installed floor does not achieve the same level of performance as a sample test and results can vary between 1 to 2 dB worse (ie with a greater L'nT,w value). Even with this possibility, the results for Tests #1, #2 and #5, all have a reasonable factor of safety and would recommend using any of these arrangements.


Manufacturers installation requirements are to be followed when preparing and laying the underlay and hard floor covering. Typical instructions include the following as a minimum:

1. The base floor is to be flat with no bumps or dips and all glue previously applied to the floor shall be completely removed. Undulations in the slab are typically smoothed out using a layer of self leveling cement, installed strictly according to the self leveling cement manufacturer requirements
2. The underlay is to cover the entire area which is to be covered with the hard floor covering and not adhered to the slab.
3. The hard floor covering is to be installed with a gap of ~5 mm to 10mm from all walls and door jams to reduce the chance of floor vibration being transmitted to walls. This gap is to be filled with a flexible mastic material, typically colored silicon or foam bead.
4. The skirting boards or skirting board trims if boards are not removed are to be fitted with a 2 mm to 5mm gap between the floor finish and the underside of the skirting board and door jams to reduce the chance of floor vibration being transmitted to walls. A common method to achieve this is to separate the added skirting board/trim from the hard floor finish with strips of 2mm to 5mm cardboard or spacers which is removed at completion of securing the skirting boards. Alternatively a soft rubber or foam bead can be used to fill the gap

We believe that if the floor is laid strictly according to the above instructions, the impact performance of the as installed floor will be very similar to the test results of the sample floor test results.

We recommend that a copy of this report be given to the installing contractor and the client requires that they comply with our Compliance Recommendations.

We trust this meets with your understanding and please contact us if you have any questions.

Yours Sincerely; Warwick West, 
Director West & Associates Pty. Ltd. ,MIEAust, CPEng, NER APEA Engineer IntPE Aust, BE, Grad. Dip. Arch.
Acou. UNSW
Appendices 1 to 5 Field Impact Sound Insulation Test results

APPENDIX 1

Standardized impact sound pressure levels measured according to AS/ISO 140.7, Single rating number according to AS/ISO 717.2
Field measurements of impact sound insulation of floors

Client: OWNER UNIT 201, C/- VPI GROUP, PROPERTY MANAGERS
 Building Address: UNIT 201, 12 JEAN WAILES AVE. RHODES, SP81356
 Test Date: 17/07/2019
 Job Number: 2213/6
 Receiving Room Vol: 105 m³
 Building description and construction:

The building at site is a 4 story apartment block built in masonry with steel reinforced concrete floors. The receiver room had plasterboard ceiling with unknown cavity depth, common walls of plasterboard.

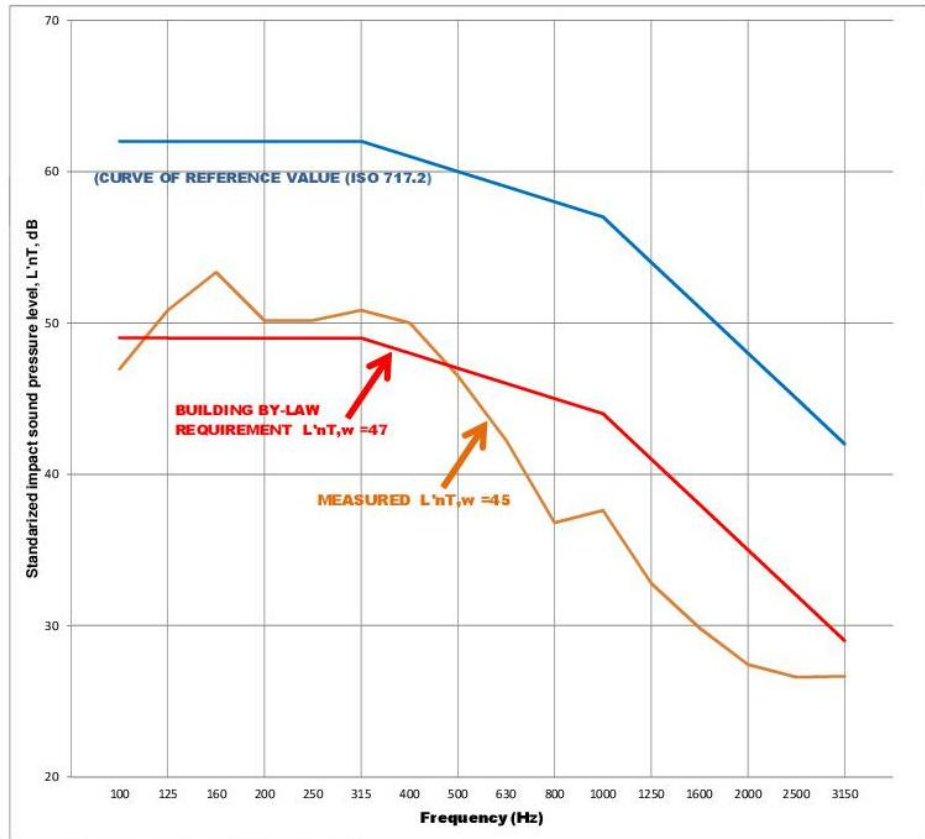
Test equipment and procedures:

Sound pressure measurements taken using a SVAN SLM Model 945A, Tapping machine BSWA-TEC Model TM002. Measurements taken and field calibration checks made to AS 1055.1. 4 airborne measurements taken in receiver room each with the tapping machine in source room. Airborne sound insulation was measured between source and receiver room confirming flanking noise was not interfering impact measurements. Minimum 3 background and reverberation measures taken in receiver room

Tested arrangements:

TEST#1; UNIT 201 LOUNGE ROOM(L2-SOURCE) TO UNIT 101 LOUNGE ROOM(L1-RECEIVER), 6.5 MM HYBRID HOMESTEAD LAMINATED TIMBER COMPLETE WITH RUBBER UNDERLAY ON CONCRETE SLAB OF UNKNOWN THICKNESS

Frequency f (Hz)	L'nT (dB)
100	46.9
125	50.8
160	53.3
200	50.1
250	50.2
315	50.8
400	50.0
500	46.5
630	42.2
800	36.8
1000	37.6
1250	32.8
1600	29.8
2000	27.4
2500	26.6
3150	26.6



Rating according to AS ISO 717.2, Reported according to AS/NZS ISO 140.7

Evaluation based on field measurement results obtained in one third octave bands by an engineered method

L'nT,w = 45	Ci ₁₀₀₋₂₀₀₀ = (-0.5) dB;	Ci ₅₀₋₂₅₀₀ = (0.2) dB	Source/Receiver Airborne Diff = 47 dB(A)	TIME
			Initial Field Calibration Check = 94 dB(A)	10:47
			Final Field Calibration Check = 94.2 dB(A)	11:35

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ACOUSTIC AND AIRCONDITIONING ENGINEERS Phone: 02 9908 3733

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Associated Report: 19168

Associated Report Prepared By: Warwick West

Warwick West

Associated Report Date: 17/07/2019

Associated Report Checked By: Joel West

Joel West

APPENDIX 2

Standardized impact sound pressure levels measured according to AS/ISO 140.7, Single rating number according to AS/ISO 717.2
Field measurements of impact sound insulation of floors

Client: OWNER UNIT 201, C/- VPI GROUP, PROPERTY MANAGERS
 Building Address: UNIT 201, 12 JEAN WAILES AVE. RHODES, SP81356
 Test Date: 17/07/2019
 Job Number: 2213/6
 Receiving Room Vol: 105 m³
 Building description and construction:

The building at site is a 4 story apartment block built in masonry with steel reinforced concrete floors. The receiver room had plasterboard ceiling with unknown cavity depth, common walls of plasterboard.

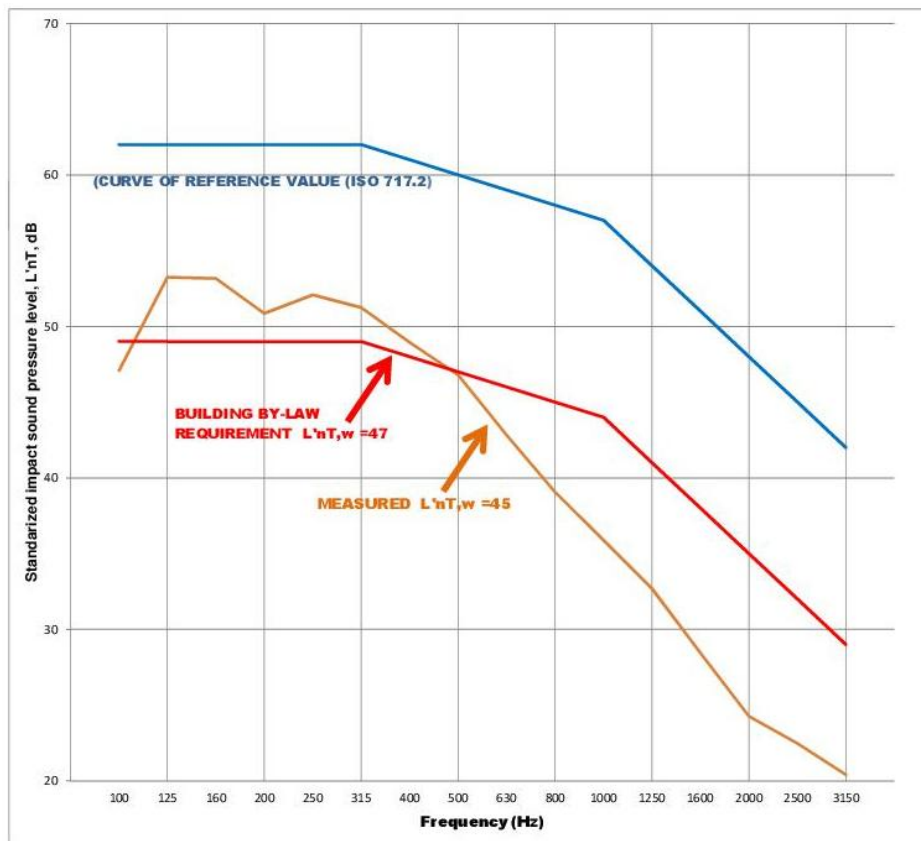
Test equipment and procedures:

Sound pressure measurements taken using a SVAN SLM Model 945A, Tapping machine BSWA-TEC Model TM002. Measurements taken and field calibration checks made to AS 1055.1. 4 airborne measurements taken in receiver room each with the tapping machine in source room. Airborne sound insulation was measured between source and receiver room confirming flanking noise was not interfering impact measurements. Minimum 3 background and reverberation measures taken in receiver room

Tested arrangements:

TEST#2; UNIT 201 LOUNGE ROOM(L2-SOURCE) TO UNIT 101 LOUNGE ROOM(L1-RECEIVER), 7.0 MM HYBRID TOP DECK LAMINATED TIMBER COMPLETE WITH RUBBER UNDERLAY ON CONCRETE SLAB OF UNKNOWN THICKNESS

Frequency f (Hz)	L'nT (dB)
100	47.1
125	53.3
160	53.2
200	50.9
250	52.1
315	51.2
400	48.9
500	46.8
630	42.8
800	39.1
1000	35.9
1250	32.7
1600	28.4
2000	24.3
2500	22.5
3150	20.4



Rating according to AS ISO 717.2, Reported according to AS/NZS ISO 140.7

Evaluation based on field measurement results obtained in one third octave bands by an engineered method

L'nT,w = 45	Ci ₁₀₀₋₂₀₀₀ = (0.2)dB;	Ci ₅₀₋₂₅₀₀ = (0.7)dB	Source/Receiver Airborne Diff = 47 dB(A)	TIME
			Initial Field Calibration Check = 94 dB(A)	10:47
			Final Field Calibration Check = 94.2 dB(A)	11:35

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Associated Report: 19168 Associated Report Prepared By: Warwick West
 Associated Report Date: 17/07/2019 Associated Report Checked By: Joel West

APPENDIX 3

Standardized impact sound pressure levels measured according to AS/ISO 140.7, Single rating number according to AS/ISO 717.2
Field measurements of impact sound insulation of floors

Client: OWNER UNIT 201, C/- VPI GROUP, PROPERTY MANAGERS
 Building Address: UNIT 201, 12 JEAN WAILES AVE. RHODES, SP81356
 Test Date: 17/07/2019
 Job Number: 2213/6
 Receiving Room Vol: 105 m³
 Building description and construction:

The building at site is a 4 story apartment block built in masonry with steel reinforced concrete floors. The receiver room had plasterboard ceiling with unknown cavity depth, common walls of plasterboard.

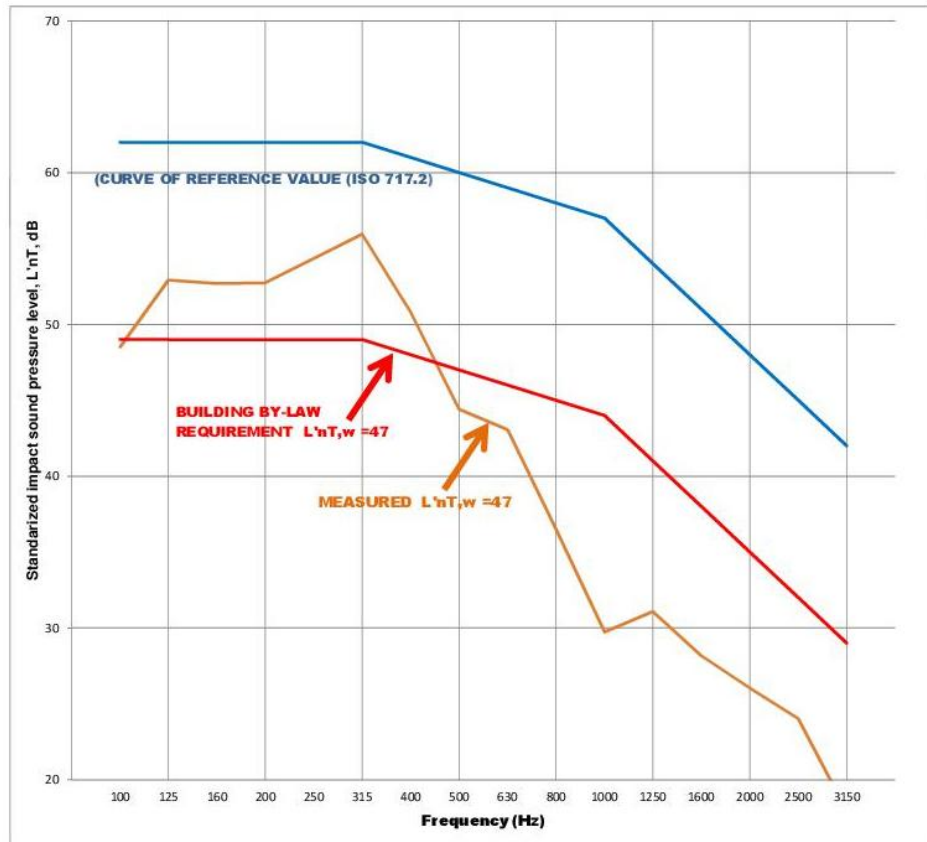
Test equipment and procedures:

Sound pressure measurements taken using a SVAN SLM Model 945A, Tapping machine BSWA-TEC Model TM002. Measurements taken and field calibration checks made to AS 1055.1. 4 airborne measurements taken in receiver room each with the tapping machine in source room. Airborne sound insulation was measured between source and receiver room confirming flanking noise was not interfering impact measurements. Minimum 3 background and reverberation measures taken in receiver room

Tested arrangements:

TEST#3; UNIT 201 LOUNGE ROOM(L2-SOURCE) TO UNIT 101 LOUNGE ROOM(L1-RECEIVER), 14 MM LAMINATED TIMBER OVER 4MM LAMILAY SUPERFELT ON CONCRETE SLAB OF UNKNOWN THICKNESS

Frequency f (Hz)	L'nT (dB)
100	48.5
125	52.9
160	52.7
200	52.7
250	54.3
315	55.9
400	50.8
500	44.4
630	43.1
800	36.5
1000	29.7
1250	31.1
1600	28.2
2000	26.0
2500	24.0
3150	18.0



Rating according to AS ISO 717.2, Reported according to AS/NZS ISO 140.7

Evaluation based on field measurement results obtained in one third octave bands by an engineered method

L'nT,w= 47 Ci₁₀₀₋₂₀₀₀=(-0.3)dB; Ci₅₀₋₂₅₀₀=(0)dB

Source/Receiver Airborne Diff =	47 dB(A)	TIME
Initial Field Calibration Check =	94 dB(A)	10:47
Final Field Calibration Check =	94.2 dB(A)	11:35

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Associated Report Date: 17/07/2019	Associated Report Checked By: Joel West	

APPENDIX 4

Standardized impact sound pressure levels measured according to AS/ISO 140.7, Single rating number according to AS/ISO 717.2
Field measurements of impact sound insulation of floors

Client: OWNER UNIT 201, C/- VPI GROUP, PROPERTY MANAGERS
 Building Address: UNIT 201, 12 JEAN WAILES AVE. RHODES, SP81356
 Test Date: 17/07/2019
 Job Number: 2213/6
 Receiving Room Vol: 105 m³
 Building description and construction:

The building at site is a 4 story apartment block built in masonry with steel reinforced concrete floors. The receiver room had plasterboard ceiling with unknown cavity depth, common walls of plasterboard.

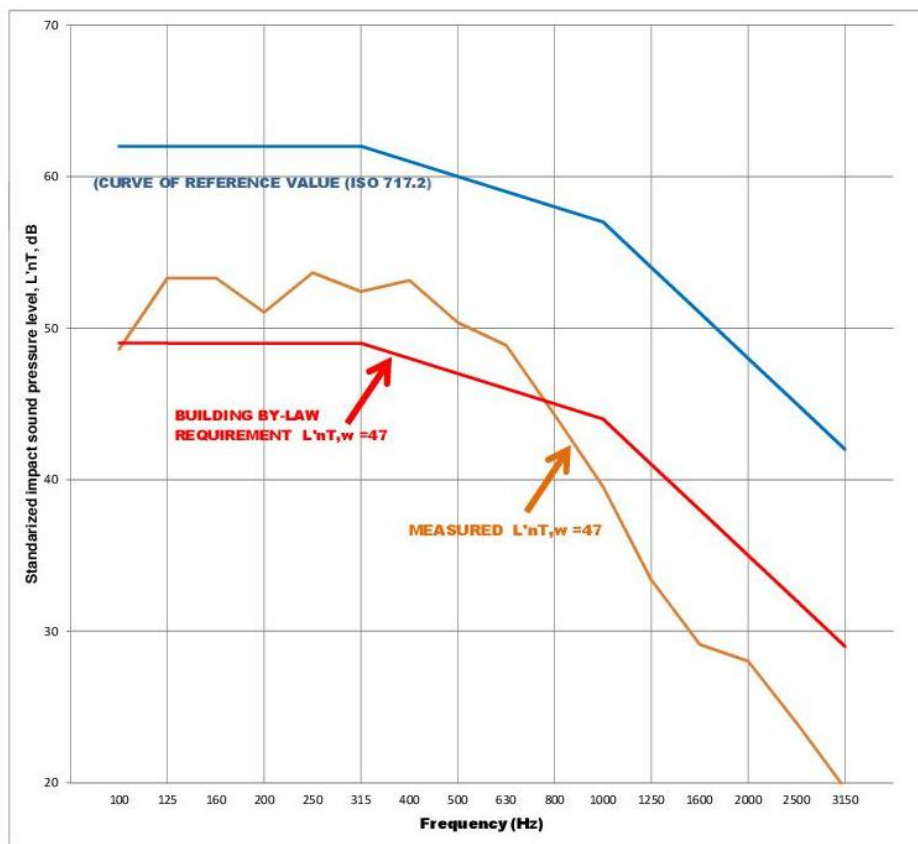
Test equipment and procedures:

Sound pressure measurements taken using a SVAN SLM Model 945A, Tapping machine BSWA-TEC Model TM002. Measurements taken and field calibration checks made to AS 1055.1. 4 airborne measurements taken in receiver room each with the tapping machine in source room. Airborne sound insulation was measured between source and receiver room confirming flanking noise was not interfering impact measurements. Minimum 3 background and reverberation measures taken in receiver room

Tested arrangements:

TEST#4; UNIT 201 LOUNGE ROOM(L2-SOURCE) TO UNIT 101 LOUNGE ROOM(L1-RECEIVER), 14 MM LAMINATED TIMBER OVER 5MM REGUPOL 5512 ON CONCRETE SLAB OF UNKNOWN THICKNESS

Frequency f (Hz)	L'nT (dB)
100	48.6
125	53.3
160	53.3
200	51.0
250	53.7
315	52.4
400	53.1
500	50.4
630	48.9
800	44.3
1000	39.5
1250	33.4
1600	29.1
2000	28.0
2500	23.9
3150	19.6



Rating according to AS ISO 717.2, Reported according to AS/NZS ISO 140.7

Evaluation based on field measurement results obtained in one third octave bands by an engineered method

L'nT,w = 47	Ci ₁₀₀₋₂₀₀₀ = (-0.3) dB;	Ci ₅₀₋₂₅₀₀ = (0) dB	Source/Receiver Airborne Diff = 47 dB(A)	TIME
			Initial Field Calibration Check = 94 dB(A)	10:47
			Final Field Calibration Check = 94.2 dB(A)	11:35

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Associated Report: 19168 Associated Report Prepared By: Warwick West
 Associated Report Date: 17/07/2019 Associated Report Checked By: Joel West

APPENDIX 5

Standardized impact sound pressure levels measured according to AS/ISO 140.7, Single rating number according to AS/ISO 717.2
Field measurements of impact sound insulation of floors

Client: OWNER UNIT 201, C/- VPI GROUP, PROPERTY MANAGERS
 Building Address: UNIT 201, 12 JEAN WAILES AVE. RHODES, SP81356
 Test Date: 17/07/2019
 Job Number: 2213/6
 Receiving Room Vol: 105 m³
 Building description and construction:

The building at site is a 4 story apartment block built in masonry with steel reinforced concrete floors. The receiver room had plasterboard ceiling with unknown cavity depth, common walls of plasterboard.

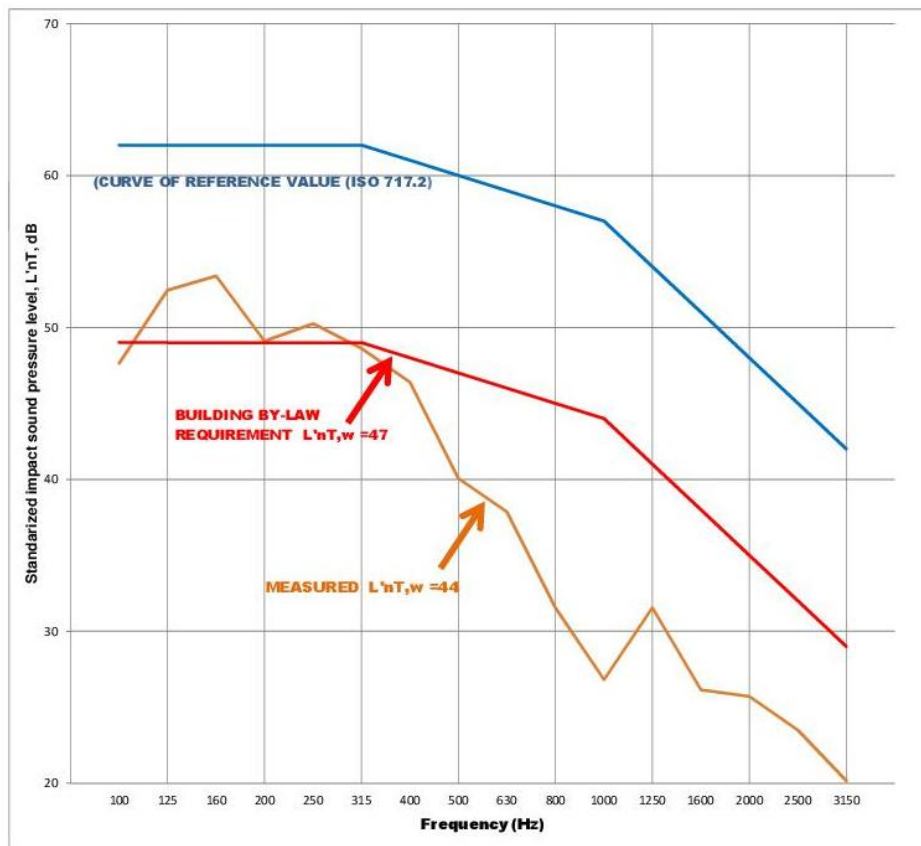
Test equipment and procedures:

Sound pressure measurements taken using a SVAN SLM Model 945A, Tapping machine BSWA-TEC Model TM002. Measurements taken and field calibration checks made to AS 1055.1. 4 airborne measurements taken in receiver room each with the tapping machine in source room. Airborne sound insulation was measured between source and receiver room confirming flanking noise was not interfering impact measurements. Minimum 3 background and reverberation measures taken in receiver room

Tested arrangements:

TEST#5; UNIT 201 LOUNGE ROOM(L2-SOURCE) TO UNIT 101 LOUNGE ROOM(L1-RECEIVER), 6.5 MM HYBRID HOMESTEAD LAMINATED TIMBER COMPLETE WITH RUBBER UNDERLAY OVER 5MM REGUPOL 5512 ON CONCRETE SLAB OF UNKNOWN THICKNESS

Frequency f (Hz)	L'nT (dB)
100	47.6
125	52.4
160	53.4
200	49.1
250	50.2
315	48.6
400	46.4
500	40.0
630	37.8
800	31.6
1000	26.8
1250	31.6
1600	26.1
2000	25.7
2500	23.5
3150	20.2



Rating according to AS ISO 717.2, Reported according to AS/NZS ISO 140.7

Evaluation based on field measurement results obtained in one third octave bands by an engineered method

L'nT,w= 44	Ci ₁₀₀₋₂₀₀₀ =(-0.1)dB;	Ci ₅₀₋₂₅₀₀ =(0.4)dB	Source/Receiver Airborne Diff = 47 dB(A)	TIME
			Initial Field Calibration Check = 94 dB(A)	10:47
			Final Field Calibration Check = 94.2 dB(A)	11:35

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