



KOIKAS ACOUSTICS PTY LTD

CONSULTANTS IN NOISE & VIBRATION

ABN 12 058 524 771

Commercial 1 (Unit 27)

Ph: (02) 9587 9702

637 - 645 Forest Road

Fax: (02) 9587 5337

BEXLEY NSW 2207

E-mail: Office@KoikasAcoustics.com

IMPACT NOISE TESTING

ACOUSTIC UNDERLAY TESTING


SILVER TRADING TIMBER FLOORING

Date: Friday, 26th February 2016

File Reference: 2941C20160226mfcSilverTradingTimberFlooring

Koikas Acoustics Pty Ltd

Commercial 1, Unit 27,
637-645 Forest Road,
Bexley NSW 2207

| DOCUMENT CONTROL | |
|---------------------------|---|
| Project Title | Impact Noise Testing Acoustic Underlay Testing Silver Trading Timber Flooring |
| Our Project Number | 2848 |
| Our File Reference | 2941C20160226mfcSilverTradingTimberFlooring |
| File Link | Z:\ACOUSTICS\ACOUSTICS 16\Compliance\Partition Testing Impact\2941C20160226mfcSilverTradingTimberFlooring.docx |
| Revision | V1 26 th Feb. 2016 |
| | |
| | |
| | |
| | |
| Prepared By | Michael Fan Chiang |
| Approved By | Nick Koikas  |
| Client | Silver Trading Timber Flooring Attention: Patrick Yu E-mail: info@silvertimberflooring.com.au |

The information contained herein should not be reproduced except in full. The information provided in this report relates to acoustic matters only. Supplementary advice should be sought for other matters relating to construction, design, structural, fire-rating, water proofing, and the likes.

IMPACT NOISE TESTING
ACOUSTIC UNDERLAY TESTING
SILVER TRADING TIMBER FLOORING

CONTENTS

| | | |
|------------|--|-----------|
| 1.0 | CONSULTANT'S BRIEF | 4 |
| 2.0 | TESTING SAMPLES AND CONDITIONS | 5 |
| 3.0 | IMPACT NOISE CRITERION | 6 |
| 3.1 | BCA REQUIREMENT..... | 6 |
| 3.2 | AAAC STAR RATING PERFORMANCE REQUIREMENTS..... | 6 |
| 3.3 | CITY OF SYDNEY DCP 2012 | 6 |
| 4.0 | IMPACT NOISE TESTING | 7 |
| 4.1 | ASSESSMENT PROCEDURES..... | 7 |
| 4.2 | AMBIENT BACKGROUND NOISE MEASUREMENT | 7 |
| 4.3 | REVERBERATION TIME MEASUREMENTS..... | 8 |
| 4.4 | INSTRUMENTATION AND CALIBRATION..... | 8 |
| 5.0 | MEASURED RESULTS..... | 9 |
| 6.0 | CONCLUSION | 11 |

Appendix A - Performance Graphs and Calculations

IMPACT NOISE TESTING
ACOUSTIC UNDERLAY TESTING
SILVER TRADING TIMBER FLOORING

1.0 CONSULTANT'S BRIEF

Koikas Acoustics was requested by Silver Trading Timber Flooring to conduct impact noise testing of four types of timber flooring on three (3) different acoustic underlays. Testing was undertaken between two sole occupancy units in a Sydney suburb.

Test results were compared to the acoustics requirements of:

- *Part F5 of BCA (Building Codes of Australia),*
- the standards prescribed by the *Association of Australian Acoustical Consultants (AAAC)* and
- City of Sydney Council's DCP 2012 requirement.

2.0 TESTING SAMPLES AND CONDITIONS

Koikas Acoustics has been advised that the ceiling/floor systems separating the living/dining areas of residential units were constructed of the following building materials:

Living/Dining Areas:

- 200 mm thick concrete slab;
- ~ 50 mm ceiling cavity, and
- 13 mm thick plasterboard suspended ceiling.

Hereafter referred to as the “*existing ceiling/floor system*” “ECFS”.

The tests were conducted on the existing ceiling/floor system (ECFS) with the following timber flooring and acoustic underlays:

- Test 1: 8 mm Laminated Timber Flooring over 6 mm Foam Underlay
- Test 2: 8 mm Laminated Timber Flooring over 3 mm Silent Pro Underlay
- Test 3: 8 mm Laminated Timber Flooring over 2 mm Silent Eco Underlay
- Test 4: 12 mm Laminated Timber Flooring over 6 mm Foam Underlay
- Test 5: 12 mm Laminated Timber Flooring over 3 mm Silent Pro Underlay
- Test 6: 12 mm Laminated Timber Flooring over 2 mm Silent Eco Underlay
- Test 7: 14 mm Bamboo Flooring over 6 mm Foam Underlay
- Test 8: 14 mm Bamboo Flooring over 3 mm Silent Pro Underlay
- Test 9: 14 mm Bamboo Flooring over 2 mm Silent Eco Underlay
- Test 10: 15 mm Engineered Timber Flooring over 6 mm Foam Underlay
- Test 11: 15 mm Engineered Timber Flooring over 3 mm Silent Pro Underlay
- Test 12: 15 mm Engineered Timber Flooring over 2 mm Silent Eco Underlay

3.0 IMPACT NOISE CRITERION

3.1 BCA REQUIREMENT

In accordance with current BCA, a floor in a Class 2 or 3 building must have an $D_{nTw} + C_{tr}$ (airborne) not less than 45 and an $L_{nTw} + C_i$ (impact) not more than 62 if it separates-

- (i) sole-occupancy units; or
- (ii) a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.

3.2 AAAC STAR RATING PERFORMANCE REQUIREMENTS

Reproduced from the AAAC Guideline for Apartment and Townhouse Acoustic Ratings, the following Table (Section C) describes the acoustic ratings with reference to the Star Rating System.

| Table 1. Star Rating requirements for Inter-tenancy Activities – Published by the AAAC | | | | | |
|--|--------|--------|--------|--------|--------|
| INTER-TENANCY ACTIVITIES | 2 Star | 3 Star | 4 Star | 5 Star | 6 Star |
| (a) Airborne sound insulation for walls and floors | | | | | |
| - Between separate tenancies $D_{nTw} + C_{tr} \geq$ | 35 | 40 | 45 | 50 | 55 |
| - Between a lobby/corridor & bedroom $D_{nTw} + C_{tr} \geq$ | 30 | 40 | 40 | 45 | 50 |
| - Between a lobby/corridor & living area $D_{nTw} + C_{tr} \geq$ | 25 | 40 | 40 | 40 | 45 |
| (b) Corridor, foyer to living space via door(s) $D_{nTw} \geq$ | 20 | 25 | 30 | 35 | 40 |
| (c) Impact isolation of floors | | | | | |
| - Between tenancies $L_{nTw} \leq$ | 65 | 55 | 50 | 45 | 40 |
| - Between all other spaces & tenancies $L_{nTw} \leq$ | 65 | 55 | 50 | 45 | 40 |
| (d) Impact isolation of walls | | | | | |
| - Between tenancies | No | Yes | Yes | Yes | Yes |
| - Between common areas & tenancies | No | No | No | Yes | Yes |

3.3 CITY OF SYDNEY DCP 2012

Furthermore, the impact isolation requirement of the floor system stated in [Part 10 of Section 4.2.3.11 Acoustic Privacy of City of Sydney DCP 2012](#) is also considered.

- (10) *To limit the transmission of noise to and between dwellings, all floors are to have a weighted standardised impact sound level ($L'_{nT,w}$) less than or equal to 55 where the floor separates a habitable room and another habitable room, bathroom, toilet, laundry, kitchen, plant room, stairway, public corridor, hallway and the like.*

4.0 IMPACT NOISE TESTING

The testing of the ceiling/floor system with four types of timber flooring in conjunction with three (3) different underlays were conducted inside the unfurnished living/dining spaces from one residential unit (upper floor level) to another unit (lower floor level) directly below within a residential building in Sydney suburb on Thursday, 26th February 2016.

4.1 ASSESSMENT PROCEDURES

Spectrum sound level measurements of transmitted impact noise were recorded in 1/3 octave band centre frequencies between 50 and 10,000 Hertz.

A standardised BSWA Technology Co. Type TM002 S/N 440504 Tapping Machine was used to generate the sound field in the source rooms for the impact noise test. Impact noise measurements were carried out in accordance with the recommendations of [*AS/NZS ISO 140.7:2006 “Field measurements of impact sound insulation of floors”*](#). This document provides information on appropriate measurement equipment and the proper implementation of measurement practices so as to achieve reliable results of impact sound insulation between rooms in buildings.

For determining a single number quantity for impact sound insulation between rooms in buildings when measurements are conducted “in-situ”, $L_{nT,w} + C_i$ (weighted standardised impact sound pressure level + spectrum adaptation term), the relevant standard is [*AS/NZS ISO 717.2-2004 “Impact sound insulation”*](#).

The calculated $L_{nT,w} + C_i$ derived from applying the formulae in this standard allows for a comparison between these calculated levels and the nominated acceptable levels outlined in the *Verification Methods* of the [*Building Code of Australia \(BCA\)*](#).

4.2 AMBIENT BACKGROUND NOISE MEASUREMENT

A measure of the underlying ambient noise was taken in the receiving rooms to account for the perceived noise floor in the space. Inaccuracies in the measurements and calculations can occur in areas of high ambient noise however the location of the site and receiver rooms meant little ambient noise was evident in this case.

Ambient noise levels in each 1/3 octave frequency bands were measured to take into account the effect of ambient noise during the recording of the transmitted impact noise levels.

4.3 REVERBERATION TIME MEASUREMENTS

To determine the $L_{nT,w} + C_i$, L_{nw} or $L_{nT,w}$ reverberation time measurements need to be performed in the receiving rooms. The reverberation time in the receiver room is calculated to 'standardise' the airborne/impact noise transmission measurements to reference reverberation time of 0.5 seconds as required by AS/NZS ISO 140.7:2006 Section 3.4, and AS ISO 140.4-2006 Section 3.4.

Reverberation time measurements were conducted using the balloon source method. This consisted of bursting balloons and measuring the decay of sound pressure level using a spectrum analyser. This transient response was analysed by the sound level meter and a measure of the reverberation time in 1/3 octave bands was used to calculate the standardised impact noise rating.

4.4 INSTRUMENTATION AND CALIBRATION

NTi XL2 Type Approved (TA) precision spectrum analyser S/N A2A-06312-E0 was used to measure the impact noise levels. The equipment used for taking noise level measurements is traceable to NATA certification. Field calibrations were taken before and after the measurements with a NATA calibrated field calibrator. No system drifts were noted.

5.0 MEASURED RESULTS

The results of the impact noise test is summarised in Table 2 Below.

| Table 2. Impact Noise Insulation Performance Summary | | | | |
|--|------------------------|------------------|------|--|
| Testing Samples | L' _{nTw} (Ci) | AAAC Star Rating | FIIC | Improvement in Acoustic Rating L' _{nTw} ¹ |
| Test 0: ECFS | 58 (-10) | 2 | 44 | - |
| Test 1 : <ul style="list-style-type: none"> 8 mm Laminated Timber Flooring 6 mm Foam Underlay ECFS | 44 (1) | 5 | 62 | 14 |
| Test 2 : <ul style="list-style-type: none"> 8 mm Laminated Timber Flooring 3 mm Silent Pro Underlay ECFS | 43 (1) | 5 | 64 | 15 |
| Test 3 : <ul style="list-style-type: none"> 8 mm Laminated Timber Flooring 2 mm Silent Eco Underlay ECFS | 45 (0) | 5 | 63 | 13 |
| Test 4 : <ul style="list-style-type: none"> 12 mm Laminated Timber Flooring 6 mm Foam Underlay ECFS | 45 (0) | 5 | 62 | 13 |
| Test 5 : <ul style="list-style-type: none"> 12 mm Laminated Timber Flooring 3 mm Silent Pro Underlay ECFS | 44 (0) | 5 | 63 | 14 |
| Test 6 : <ul style="list-style-type: none"> 12 mm Laminated Timber Flooring 2 mm Silent Eco Underlay ECFS | 46 (0) | 4 | 60 | 12 |
| Test 7 : <ul style="list-style-type: none"> 14 mm Bamboo Flooring 3 mm Silent Pro Underlay ECFS | 45 (0) | 5 | 62 | 13 |
| Test 8 : <ul style="list-style-type: none"> 14 mm Bamboo Flooring 2 mm Silent Eco Underlay ECFS | 45 (0) | 5 | 63 | 13 |
| Test 9: <ul style="list-style-type: none"> 14 mm Bamboo Flooring 3 mm Silent Eco Underlay ECFS | 45 (0) | 5 | 62 | 13 |
| Test 10: <ul style="list-style-type: none"> 15 mm Engineered Timber Flooring 6 mm Foam Underlay ECFS | 44 (0) | 5 | 63 | 14 |
| Test 11: <ul style="list-style-type: none"> 15 mm Engineered Timber Flooring 3 mm Silent Pro Underlay ECFS | 45 (0) | 5 | 62 | 13 |
| Test 12: <ul style="list-style-type: none"> 15 mm Engineered Timber Flooring 2 mm Silent Eco Underlay ECFS | 45 (0) | 5 | 62 | 13 |

1. All testing results were compared to the acoustic rating test results of the bare concrete floor (Test 0) ECFS and the improvement of the L'_{nTw} rating.

The following are also noted:

- All tests were undertaken with 200 mm thick concrete sub-base, 50 mm ceiling cavity and one layer of 13mm suspended plasterboard ceiling also referred to previously as **ECFS**.
- The relation between Field Impact Isolation Class (FIIC) and Impact Isolation Class (IIC) can be described by the formula $FIIC + 5 \approx IIC$.
- All the ceiling/floor system tested have also met the BCA 2013 criterion ($L_{nTw} + C_i \leq 62$) for impact noise insulation. The lower the rating number the better the acoustic performance.
- The concrete slab of the **ECFS** is connected to the concrete walls that stem to units above and below.
- Ceiling/floor cavities fitted with sound insulation batts provide better impact insulation. Impact insulation can improve in terms of insulation rating performance by 3-6 rating points.

6.0 CONCLUSION

Koikas Acoustics was requested by Silver Trading Timber Flooring to undertake impact noise tests of ceiling/floor system with four types of timber flooring in conjunction with three (3) different types of underlay samples. The acoustic performances of various ceiling/floor configurations were calculated and compared against the acoustic requirements of the current BCA, AAAC Star Ratings and City of Sydney Council's DCP 2012 requirement.

The measured/calculated L'_{nTw} (Ci) acoustic rating of the tested flooring samples in conjunction with different underlays were:

| | 8 mm Laminated | 12 mm Laminated | 14 mm Bamboo | 15 Engineered Timber |
|--------------------------|----------------|-----------------|--------------|----------------------|
| 6 mm Foam Underlay | 44 (1) | 45 (0) | 45 (0) | 44 (0) |
| 3 mm Silent Pro Underlay | 43 (1) | 44 (0) | 45 (0) | 45 (0) |
| 2 mm Silent Eco Underlay | 45 (0) | 46 (0) | 45 (0) | 45 (0) |

Detailed graphically presentation of the acoustic performance of each tested flooring sample is attached as **Appendix A**.

All tested flooring samples (Test 1~12) have complied with the:

- current BCA minimum acoustic requirements for impact ratings;
- City of Sydney Council's DCP requirements, and
- AAAC Star Rating of 5 with the exception of one test sample being Test 6.

It is recommended that testing be conducted prior to any full fit-out as the sub-base ceiling floor system and the wall junctions can impact upon the resultant flanking noise in the unit below. The above report should be reproduced in full including the attached Appendix.

APPENDIX A

**A
P
P
E
N
D
I
X

A**

APPENDIX A

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 01)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| | 8 mm Laminated Timber Flooring + 6 mm Foam Underlay | 8 + 6 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

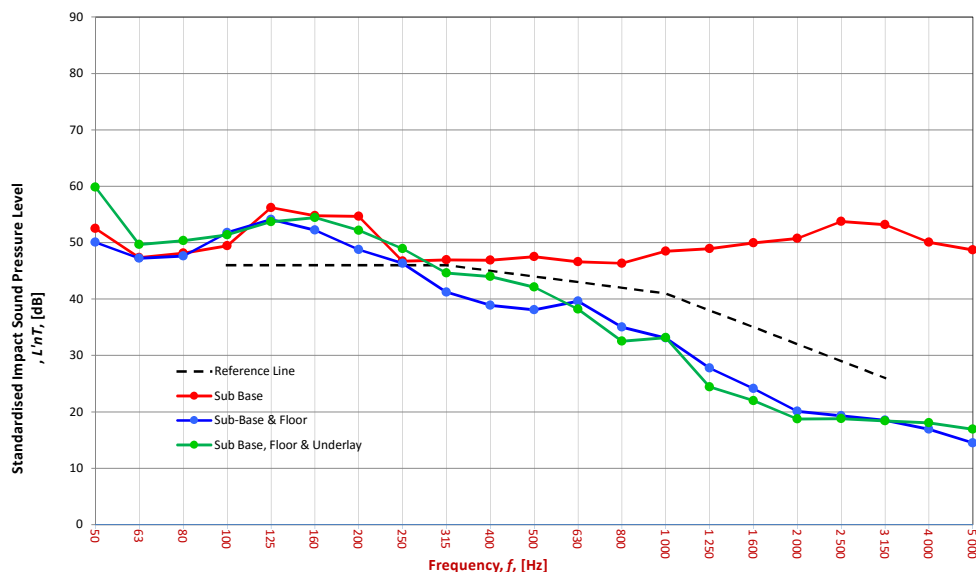
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

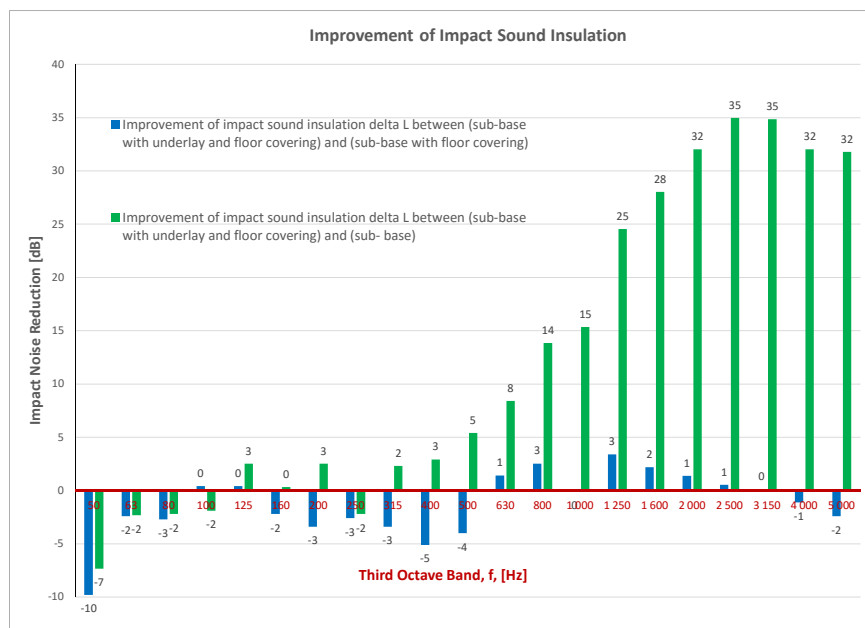
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.0 | 59.8 |
| 63 | 47.3 | 47.2 | 49.6 |
| 80 | 48.2 | 47.7 | 50.4 |
| 100 | 49.5 | 51.8 | 51.4 |
| 125 | 56.2 | 54.1 | 53.7 |
| 160 | 54.7 | 52.2 | 54.4 |
| 200 | 54.7 | 48.7 | 52.2 |
| 250 | 46.7 | 46.3 | 48.9 |
| 315 | 46.9 | 41.2 | 44.6 |
| 400 | 46.9 | 38.9 | 44.0 |
| 500 | 47.5 | 38.1 | 42.1 |
| 630 | 46.6 | 39.6 | 38.2 |
| 800 | 46.3 | 35.0 | 32.5 |
| 1 000 | 48.5 | 33.1 | 33.2 |
| 1 250 | 48.9 | 27.8 | 24.4 |
| 1 600 | 50.0 | 24.1 | 21.9 |
| 2 000 | 50.8 | 20.1 | 18.7 |
| 2 500 | 53.7 | 19.3 | 18.8 |
| 3 150 | 53.2 | 18.5 | 18.4 |
| 4 000 | 50.1 | 16.9 | 18.1 |
| 5 000 | 48.7 | 14.5 | 16.9 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC ★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 43 |
| Ci | 1 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 1 |
| AAAC ★ | 5 Star |
| FIC | 63 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 44 |
| Ci | 1 |
| Ci(50-2500) | 4 |
| Ci(63-2000) | 2 |
| AAAC ★ | 5 Star |
| FIC | 62 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 02)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| | 8 mm Laminated Timber Flooring + 3 mm Silent Pro Underlay | 8 + 3 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

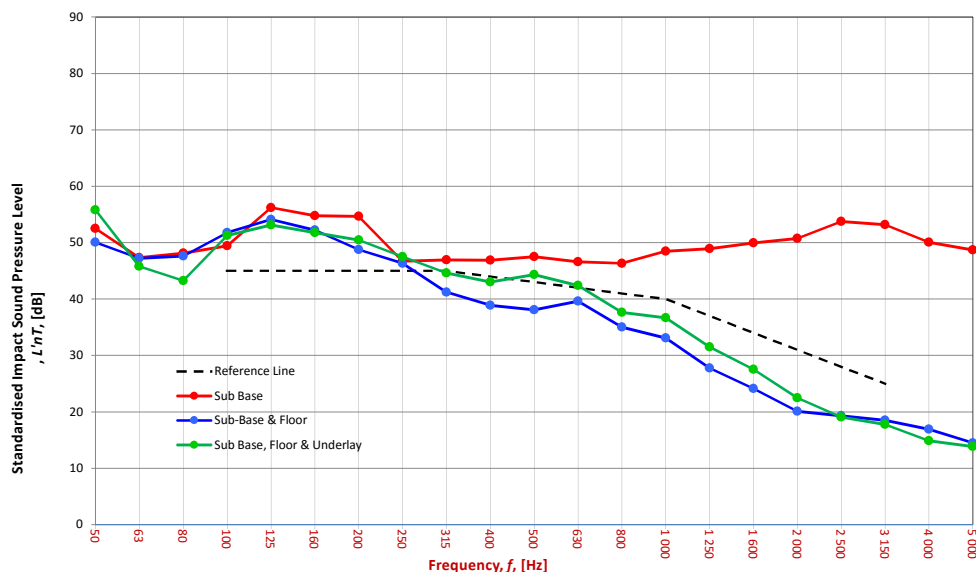
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

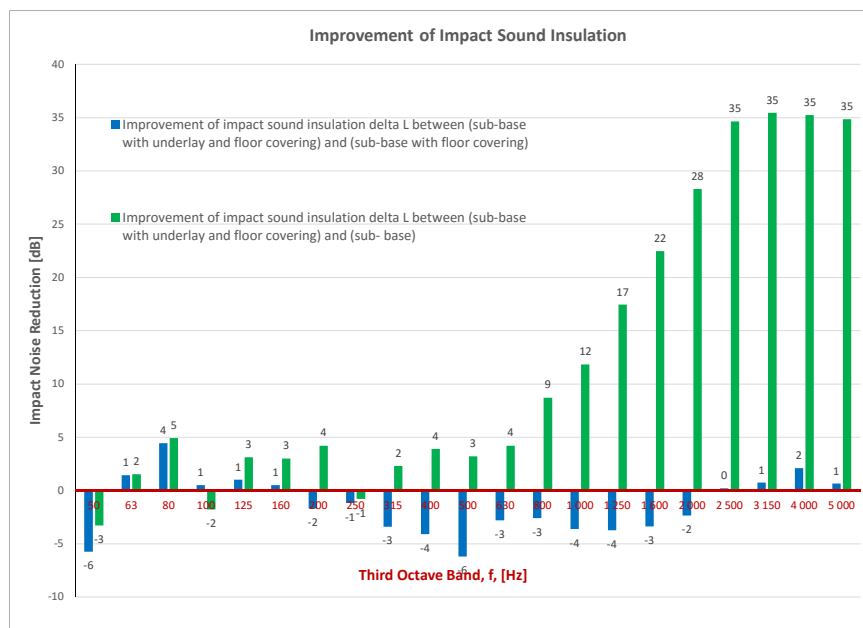
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.0 | 55.8 |
| 63 | 47.3 | 47.2 | 45.8 |
| 80 | 48.2 | 47.7 | 43.2 |
| 100 | 49.5 | 51.8 | 51.3 |
| 125 | 56.2 | 54.1 | 53.1 |
| 160 | 54.7 | 52.2 | 51.7 |
| 200 | 54.7 | 48.7 | 50.5 |
| 250 | 46.7 | 46.3 | 47.5 |
| 315 | 46.9 | 41.2 | 44.6 |
| 400 | 46.9 | 38.9 | 43.0 |
| 500 | 47.5 | 38.1 | 44.3 |
| 630 | 46.6 | 39.6 | 42.4 |
| 800 | 46.3 | 35.0 | 37.6 |
| 1 000 | 48.5 | 33.1 | 36.7 |
| 1 250 | 48.9 | 27.8 | 31.5 |
| 1 600 | 50.0 | 24.1 | 27.5 |
| 2 000 | 50.8 | 20.1 | 22.5 |
| 2 500 | 53.7 | 19.3 | 19.1 |
| 3 150 | 53.2 | 18.5 | 17.8 |
| 4 000 | 50.1 | 16.9 | 14.9 |
| 5 000 | 48.7 | 14.5 | 13.8 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 43 |
| Ci | 1 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 1 |
| AAAC★ | 5 Star |
| FIC | 63 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 43 |
| Ci | 1 |
| Ci(50-2500) | 3 |
| Ci(63-2000) | 1 |
| AAAC★ | 5 Star |
| FIC | 64 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 03)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| | 8 mm Laminated Timber Flooring + 2 mm Silent Eco Underlay | 8 + 2 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

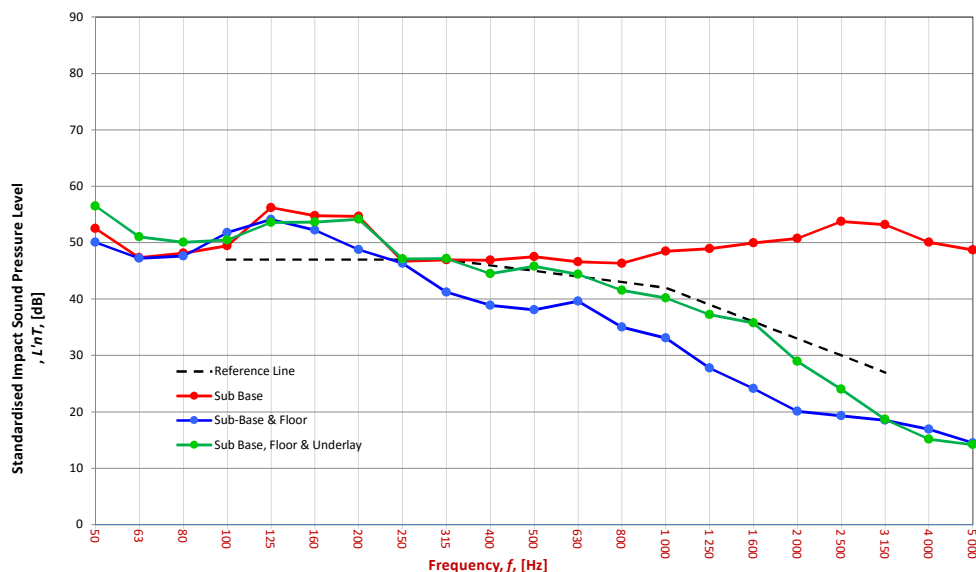
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

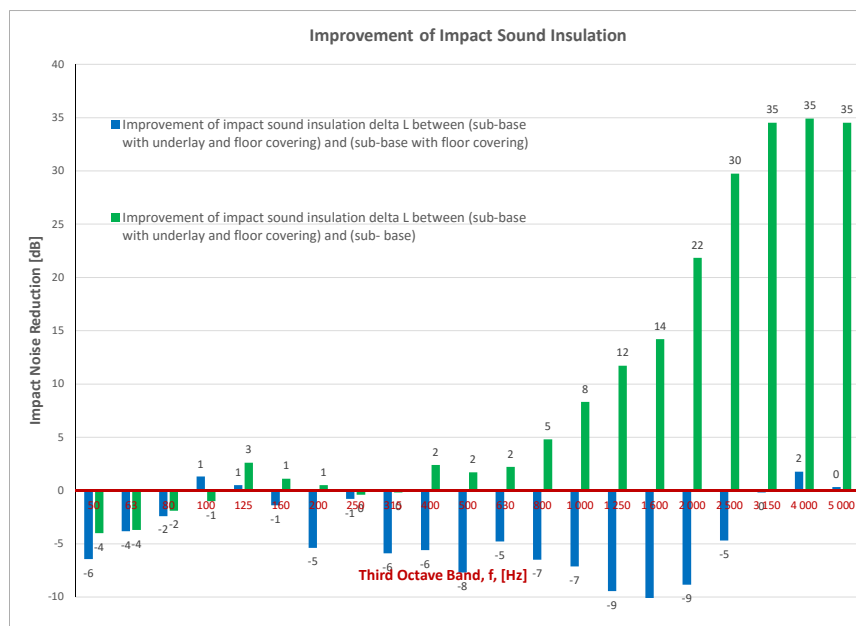
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.0 | 56.5 |
| 63 | 47.3 | 47.2 | 51.1 |
| 80 | 48.2 | 47.7 | 50.1 |
| 100 | 49.5 | 51.8 | 50.5 |
| 125 | 56.2 | 54.1 | 53.6 |
| 160 | 54.7 | 52.2 | 53.6 |
| 200 | 54.7 | 48.7 | 54.2 |
| 250 | 46.7 | 46.3 | 47.1 |
| 315 | 46.9 | 41.2 | 47.1 |
| 400 | 46.9 | 38.9 | 44.5 |
| 500 | 47.5 | 38.1 | 45.8 |
| 630 | 46.6 | 39.6 | 44.4 |
| 800 | 46.3 | 35.0 | 41.5 |
| 1 000 | 48.5 | 33.1 | 40.2 |
| 1 250 | 48.9 | 27.8 | 37.2 |
| 1 600 | 50.0 | 24.1 | 35.8 |
| 2 000 | 50.8 | 20.1 | 28.9 |
| 2 500 | 53.7 | 19.3 | 24.0 |
| 3 150 | 53.2 | 18.5 | 18.7 |
| 4 000 | 50.1 | 16.9 | 15.2 |
| 5 000 | 48.7 | 14.5 | 14.2 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 43 |
| Ci | 1 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 1 |
| AAAC★ | 5 Star |
| FIC | 63 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 45 |
| Ci | 0 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 1 |
| AAAC★ | 5 Star |
| FIC | 63 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 04)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| | 12 mm Laminated Timber Flooring + 6 mm Foam Underlay | 12 + 6 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

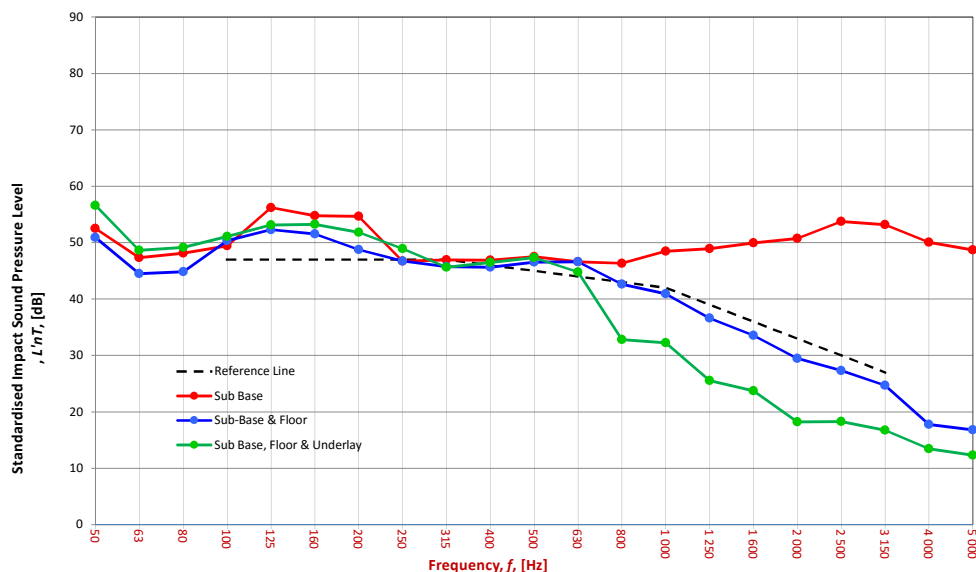
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

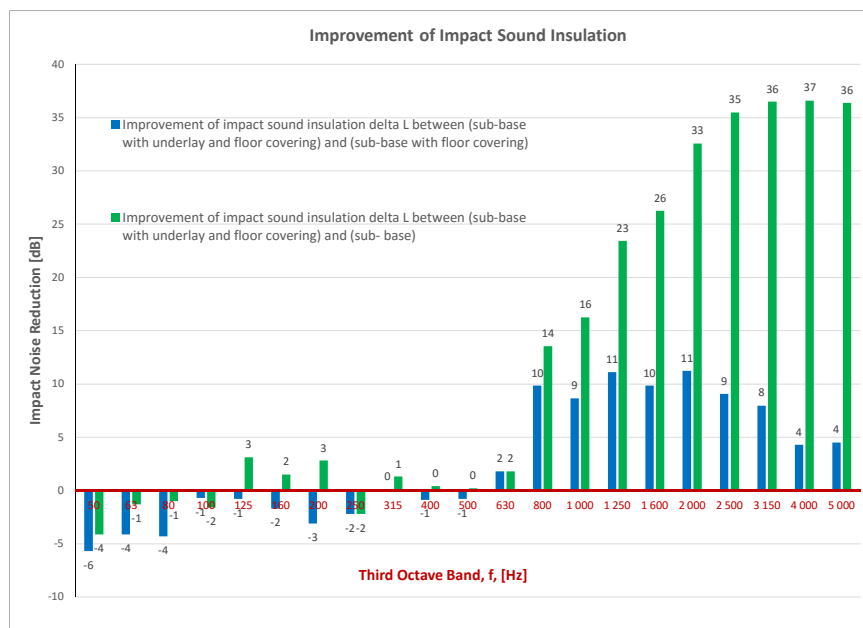
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.9 | 56.6 |
| 63 | 47.3 | 44.5 | 48.6 |
| 80 | 48.2 | 44.8 | 49.2 |
| 100 | 49.5 | 50.4 | 51.1 |
| 125 | 56.2 | 52.3 | 53.1 |
| 160 | 54.7 | 51.5 | 53.2 |
| 200 | 54.7 | 48.7 | 51.9 |
| 250 | 46.7 | 46.7 | 48.9 |
| 315 | 46.9 | 45.7 | 45.6 |
| 400 | 46.9 | 45.6 | 46.5 |
| 500 | 47.5 | 46.5 | 47.3 |
| 630 | 46.6 | 46.6 | 44.8 |
| 800 | 46.3 | 42.6 | 32.8 |
| 1 000 | 48.5 | 40.9 | 32.3 |
| 1 250 | 48.9 | 36.6 | 25.5 |
| 1 600 | 50.0 | 33.6 | 23.7 |
| 2 000 | 50.8 | 29.4 | 18.2 |
| 2 500 | 53.7 | 27.3 | 18.3 |
| 3 150 | 53.2 | 24.7 | 16.7 |
| 4 000 | 50.1 | 17.8 | 13.5 |
| 5 000 | 48.7 | 16.8 | 12.3 |



| Sub Base | | |
|-------------|--------|---------------------|
| L'nT,w | 58 | AS ISO 717.2 - 2004 |
| Ci | -10 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | -9 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -10 | AS ISO 717.2 - 2004 |
| AAAC★ | 2 Star | AAAC Guideline |
| FIC | 44 | ASTM E1007-14 |

| Sub Base & Floor | | |
|------------------|--------|---------------------|
| L'nT,w | 44 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 1 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 0 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 63 | ASTM E1007-14 |

| Sub Base, Floor & Underlay | | |
|----------------------------|--------|---------------------|
| L'nT,w | 45 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 2 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 0 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 62 | ASTM E1007-14 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 05)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| | 12 mm Laminated Timber Flooring + 3 mm Silent Pro Underlay | 12 + 3 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

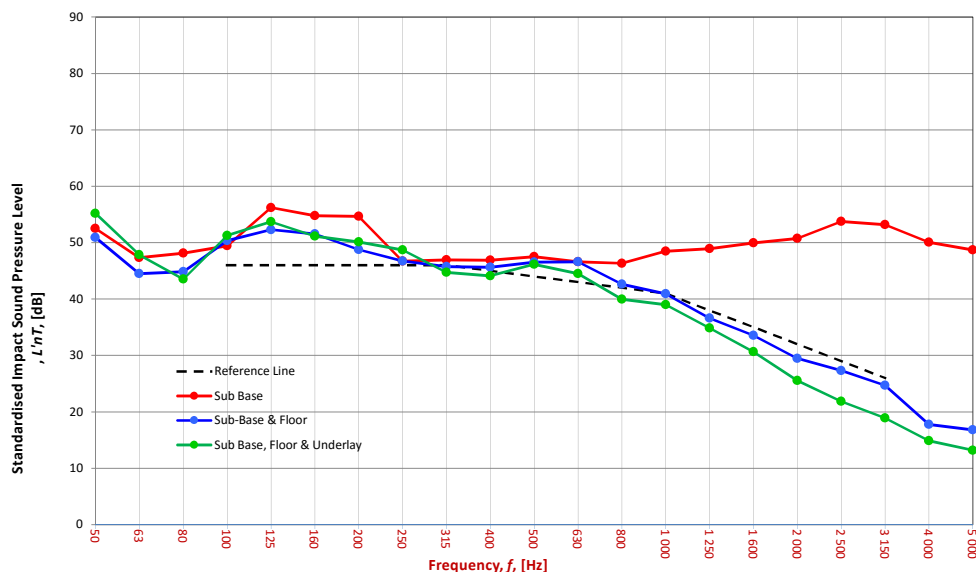
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

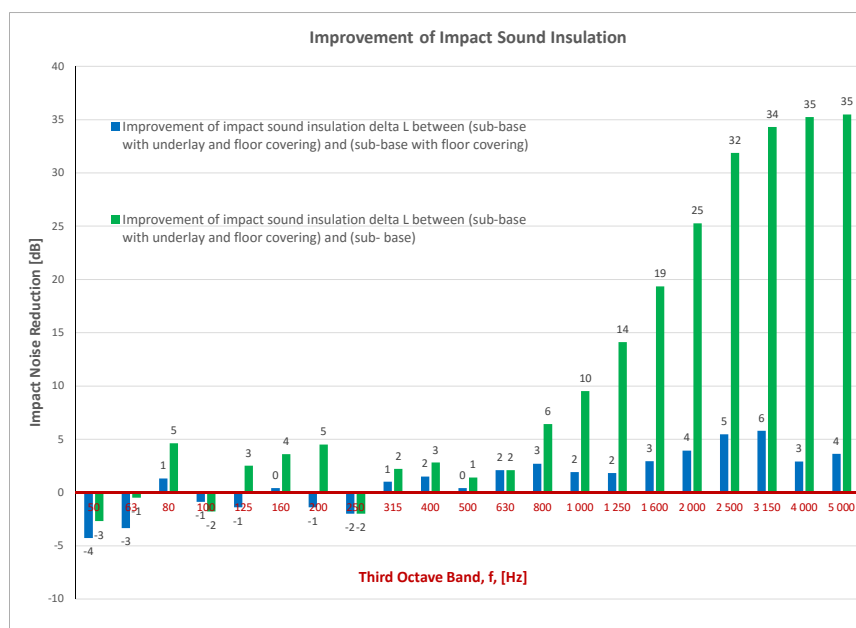
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.9 | 55.2 |
| 63 | 47.3 | 44.5 | 47.8 |
| 80 | 48.2 | 44.8 | 43.5 |
| 100 | 49.5 | 50.4 | 51.3 |
| 125 | 56.2 | 52.3 | 53.7 |
| 160 | 54.7 | 51.5 | 51.1 |
| 200 | 54.7 | 48.7 | 50.1 |
| 250 | 46.7 | 46.7 | 48.7 |
| 315 | 46.9 | 45.7 | 44.7 |
| 400 | 46.9 | 45.6 | 44.1 |
| 500 | 47.5 | 46.5 | 46.1 |
| 630 | 46.6 | 46.6 | 44.5 |
| 800 | 46.3 | 42.6 | 39.9 |
| 1 000 | 48.5 | 40.9 | 39.0 |
| 1 250 | 48.9 | 36.6 | 34.8 |
| 1 600 | 50.0 | 33.6 | 30.6 |
| 2 000 | 50.8 | 29.4 | 25.5 |
| 2 500 | 53.7 | 27.3 | 21.9 |
| 3 150 | 53.2 | 24.7 | 18.9 |
| 4 000 | 50.1 | 17.8 | 14.9 |
| 5 000 | 48.7 | 16.8 | 13.2 |



| Sub Base | | |
|-------------|--------|---------------------|
| L'nT,w | 58 | AS ISO 717.2 - 2004 |
| Ci | -10 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | -9 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -10 | AS ISO 717.2 - 2004 |
| AAAC★ | 2 Star | AAAC Guideline |
| FIC | 44 | ASTM E1007-14 |

| Sub Base & Floor | | |
|------------------|--------|---------------------|
| L'nT,w | 44 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 1 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 0 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 63 | ASTM E1007-14 |

| Sub Base, Floor & Underlay | | |
|----------------------------|--------|---------------------|
| L'nT,w | 44 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 2 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 1 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 63 | ASTM E1007-14 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 06)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| | 12 mm Laminated Timber Flooring + 2 mm Silent Eco Underlay | 12 + 2 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

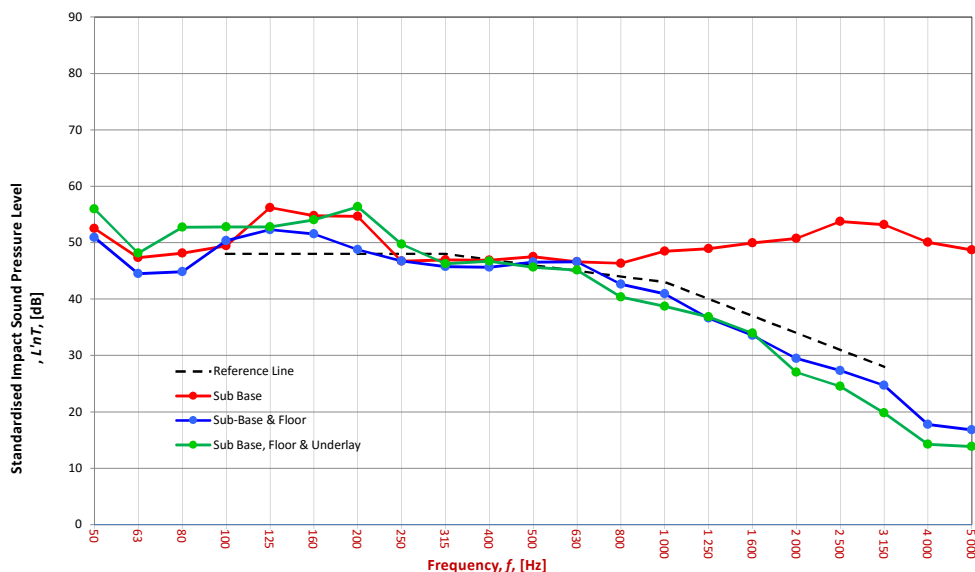
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

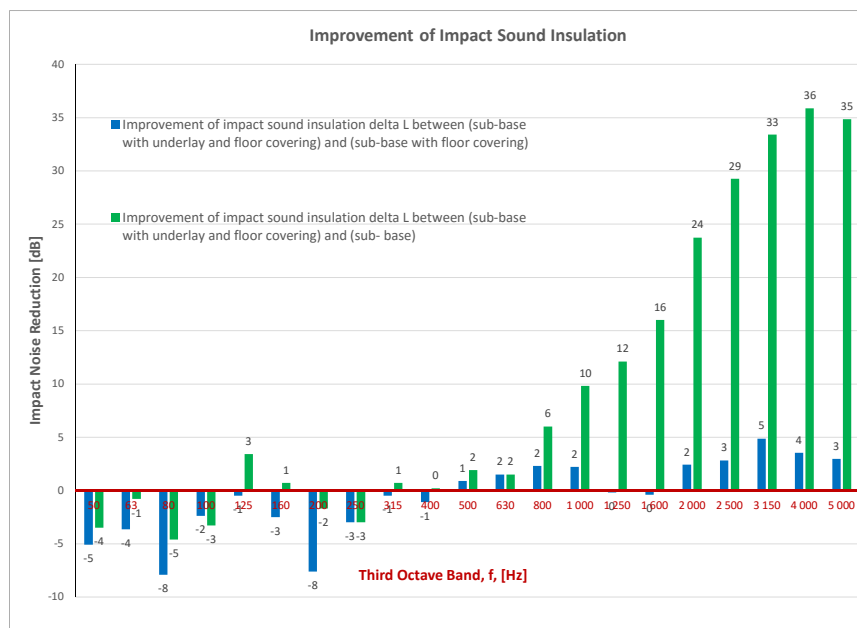
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 50.9 | 56.0 |
| 63 | 47.3 | 44.5 | 48.1 |
| 80 | 48.2 | 44.8 | 52.8 |
| 100 | 49.5 | 50.4 | 52.8 |
| 125 | 56.2 | 52.3 | 52.8 |
| 160 | 54.7 | 51.5 | 54.0 |
| 200 | 54.7 | 48.7 | 56.4 |
| 250 | 46.7 | 46.7 | 49.7 |
| 315 | 46.9 | 45.7 | 46.2 |
| 400 | 46.9 | 45.6 | 46.7 |
| 500 | 47.5 | 46.5 | 45.6 |
| 630 | 46.6 | 46.6 | 45.1 |
| 800 | 46.3 | 42.6 | 40.3 |
| 1 000 | 48.5 | 40.9 | 38.7 |
| 1 250 | 48.9 | 36.6 | 36.8 |
| 1 600 | 50.0 | 33.6 | 34.0 |
| 2 000 | 50.8 | 29.4 | 27.0 |
| 2 500 | 53.7 | 27.3 | 24.5 |
| 3 150 | 53.2 | 24.7 | 19.8 |
| 4 000 | 50.1 | 17.8 | 14.2 |
| 5 000 | 48.7 | 16.8 | 13.8 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC ★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 44 |
| Ci | 0 |
| Ci(50-2500) | 1 |
| Ci(63-2000) | 0 |
| AAAC ★ | 5 Star |
| FIC | 63 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 46 |
| Ci | 0 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 1 |
| AAAC ★ | 4 Star |
| FIC | 60 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 07)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| | 14 mm Bamboo Flooring + 6 mm Foam Underlay | 14 + 6 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

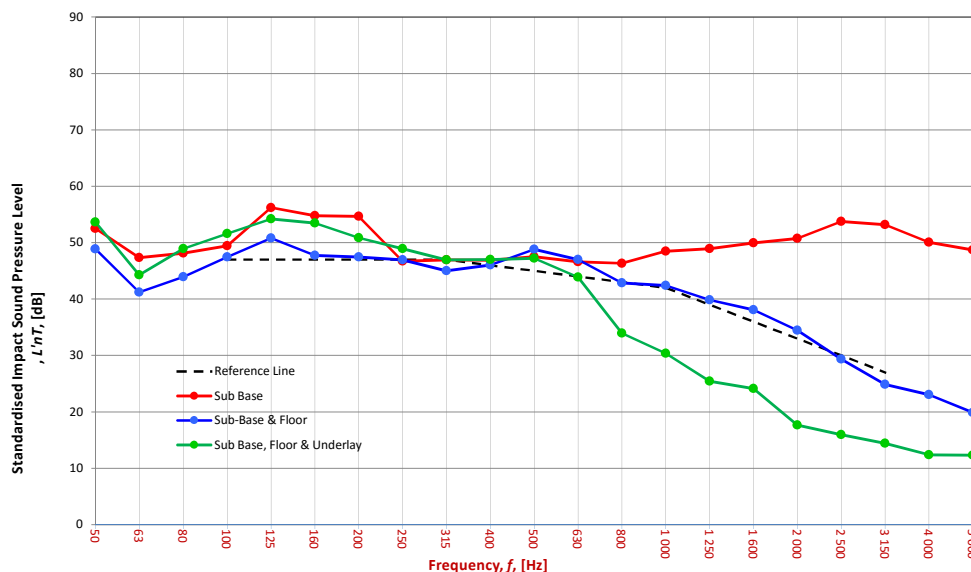
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

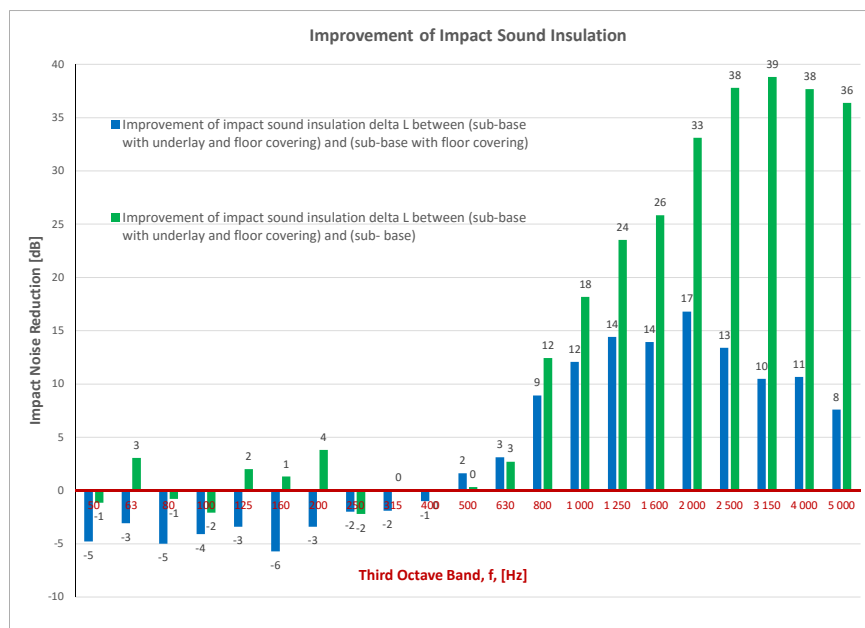
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 48.8 | 53.6 |
| 63 | 47.3 | 41.2 | 44.3 |
| 80 | 48.2 | 43.9 | 49.0 |
| 100 | 49.5 | 47.5 | 51.6 |
| 125 | 56.2 | 50.8 | 54.2 |
| 160 | 54.7 | 47.7 | 53.4 |
| 200 | 54.7 | 47.4 | 50.9 |
| 250 | 46.7 | 46.9 | 48.9 |
| 315 | 46.9 | 45.0 | 46.9 |
| 400 | 46.9 | 46.0 | 47.0 |
| 500 | 47.5 | 48.8 | 47.2 |
| 630 | 46.6 | 47.0 | 43.9 |
| 800 | 46.3 | 42.8 | 33.9 |
| 1 000 | 48.5 | 42.4 | 30.3 |
| 1 250 | 48.9 | 39.8 | 25.4 |
| 1 600 | 50.0 | 38.1 | 24.1 |
| 2 000 | 50.8 | 34.5 | 17.7 |
| 2 500 | 53.7 | 29.3 | 16.0 |
| 3 150 | 53.2 | 24.9 | 14.4 |
| 4 000 | 50.1 | 23.0 | 12.4 |
| 5 000 | 48.7 | 19.9 | 12.3 |



| Sub Base | | |
|-------------|--------|---------------------|
| L'nT,w | 58 | AS ISO 717.2 - 2004 |
| Ci | -10 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | -9 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -10 | AS ISO 717.2 - 2004 |
| AAAC★ | 2 Star | AAAC Guideline |
| FIC | 44 | ASTM E1007-14 |

| Sub Base & Floor | | |
|------------------|--------|---------------------|
| L'nT,w | 44 | AS ISO 717.2 - 2004 |
| Ci | -1 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 0 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -1 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 63 | ASTM E1007-14 |

| Sub Base, Floor & Underlay | | |
|----------------------------|--------|---------------------|
| L'nT,w | 45 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 1 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 0 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 62 | ASTM E1007-14 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 08)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| Description of Floor System | 14 mm Bamboo Flooring + 3 mm Silent Pro Underlay | 14 + 3 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

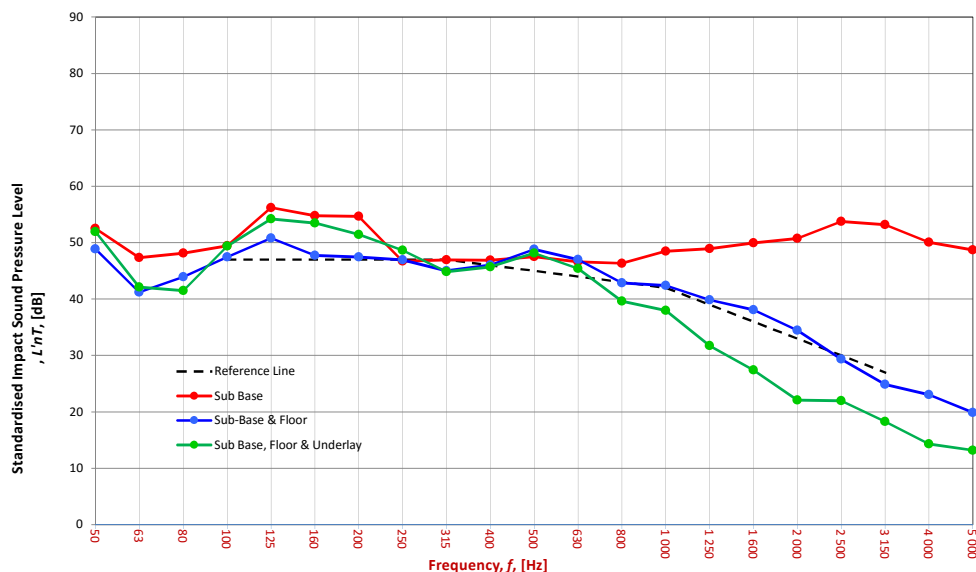
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

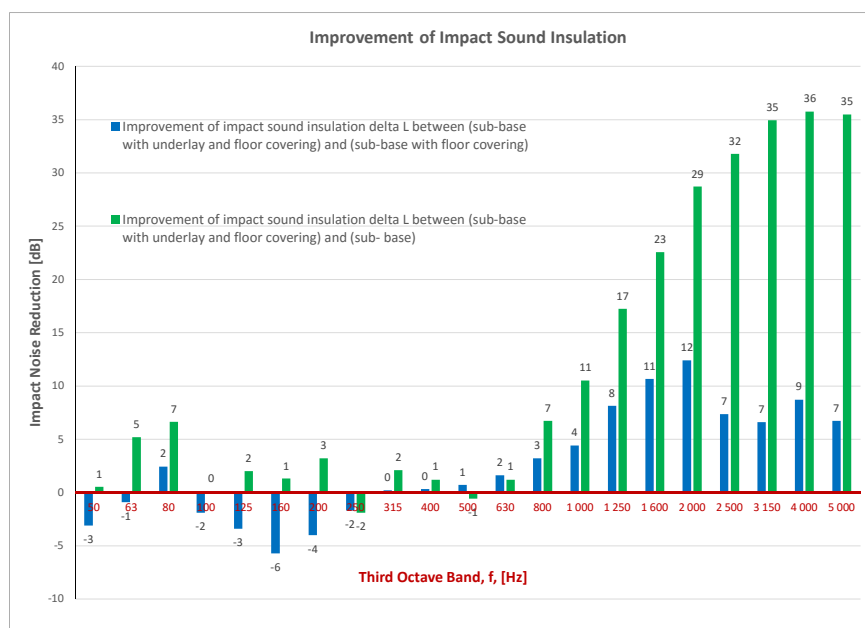
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 48.8 | 52.0 |
| 63 | 47.3 | 41.2 | 42.1 |
| 80 | 48.2 | 43.9 | 41.5 |
| 100 | 49.5 | 47.5 | 49.4 |
| 125 | 56.2 | 50.8 | 54.2 |
| 160 | 54.7 | 47.7 | 53.4 |
| 200 | 54.7 | 47.4 | 51.5 |
| 250 | 46.7 | 46.9 | 48.6 |
| 315 | 46.9 | 45.0 | 44.8 |
| 400 | 46.9 | 46.0 | 45.7 |
| 500 | 47.5 | 48.8 | 48.1 |
| 630 | 46.6 | 47.0 | 45.4 |
| 800 | 46.3 | 42.8 | 39.6 |
| 1 000 | 48.5 | 42.4 | 38.0 |
| 1 250 | 48.9 | 39.8 | 31.7 |
| 1 600 | 50.0 | 38.1 | 27.4 |
| 2 000 | 50.8 | 34.5 | 22.1 |
| 2 500 | 53.7 | 29.3 | 22.0 |
| 3 150 | 53.2 | 24.9 | 18.3 |
| 4 000 | 50.1 | 23.0 | 14.3 |
| 5 000 | 48.7 | 19.9 | 13.2 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 44 |
| Ci | -1 |
| Ci(50-2500) | 0 |
| Ci(63-2000) | -1 |
| AAAC★ | 5 Star |
| FIC | 63 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 45 |
| Ci | 0 |
| Ci(50-2500) | 1 |
| Ci(63-2000) | 0 |
| AAAC★ | 5 Star |
| FIC | 63 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 09)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|--|----------------|--------------|
| | 14 mm Bamboo Flooring + 2 mm Silent Eco Underlay | 14 + 2 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

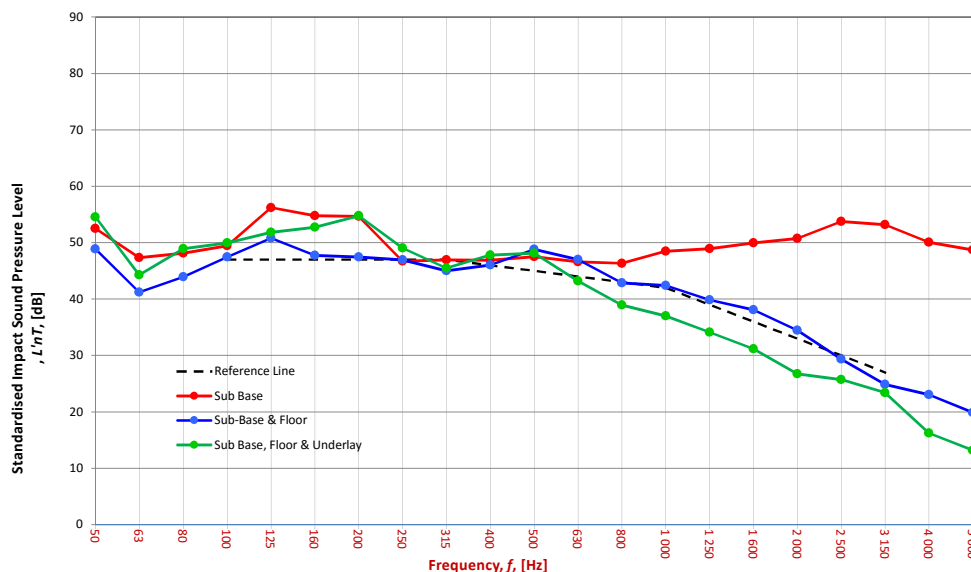
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

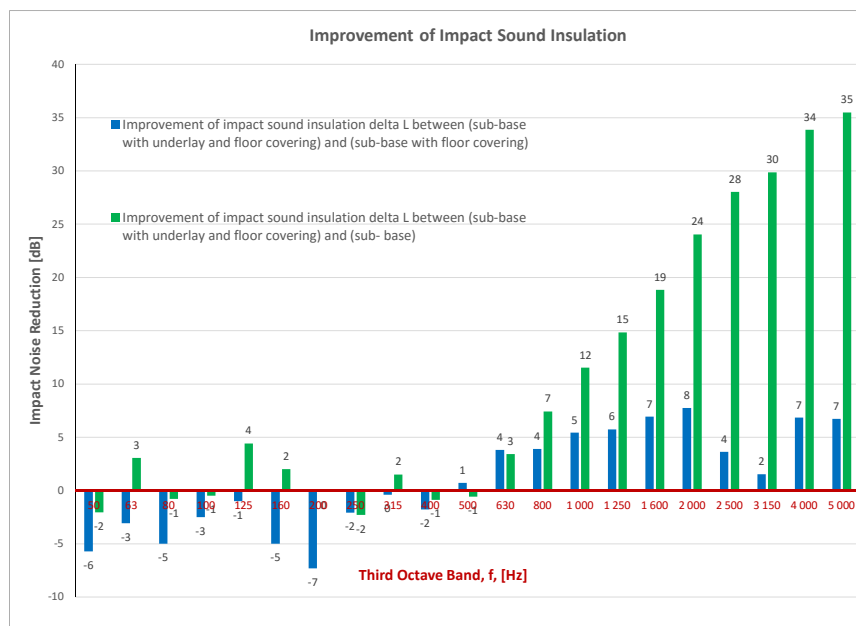
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 48.8 | 54.6 |
| 63 | 47.3 | 41.2 | 44.3 |
| 80 | 48.2 | 43.9 | 49.0 |
| 100 | 49.5 | 47.5 | 50.0 |
| 125 | 56.2 | 50.8 | 51.8 |
| 160 | 54.7 | 47.7 | 52.7 |
| 200 | 54.7 | 47.4 | 54.8 |
| 250 | 46.7 | 46.9 | 49.0 |
| 315 | 46.9 | 45.0 | 45.4 |
| 400 | 46.9 | 46.0 | 47.8 |
| 500 | 47.5 | 48.8 | 48.1 |
| 630 | 46.6 | 47.0 | 43.2 |
| 800 | 46.3 | 42.8 | 38.9 |
| 1 000 | 48.5 | 42.4 | 37.0 |
| 1 250 | 48.9 | 39.8 | 34.1 |
| 1 600 | 50.0 | 38.1 | 31.1 |
| 2 000 | 50.8 | 34.5 | 26.7 |
| 2 500 | 53.7 | 29.3 | 25.7 |
| 3 150 | 53.2 | 24.9 | 23.4 |
| 4 000 | 50.1 | 23.0 | 16.2 |
| 5 000 | 48.7 | 19.9 | 13.2 |



| Sub Base | | |
|-------------|--------|---------------------|
| L'nT,w | 58 | AS ISO 717.2 - 2004 |
| Ci | -10 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | -9 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -10 | AS ISO 717.2 - 2004 |
| AAAC★ | 2 Star | AAAC Guideline |
| FIC | 44 | ASTM E1007-14 |

| Sub Base & Floor | | |
|------------------|--------|---------------------|
| L'nT,w | 44 | AS ISO 717.2 - 2004 |
| Ci | -1 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 0 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | -1 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 63 | ASTM E1007-14 |

| Sub Base, Floor & Underlay | | |
|----------------------------|--------|---------------------|
| L'nT,w | 45 | AS ISO 717.2 - 2004 |
| Ci | 0 | AS ISO 717.2 - 2004 |
| Ci(50-2500) | 1 | AS ISO 717.2 - 2004 |
| Ci(63-2000) | 0 | AS ISO 717.2 - 2004 |
| AAAC★ | 5 Star | AAAC Guideline |
| FIC | 62 | ASTM E1007-14 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 10)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| Description of Floor System | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| | 15 mm Engineered Timber Flooring + 6 mm Foam Underlay | 15 + 6 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

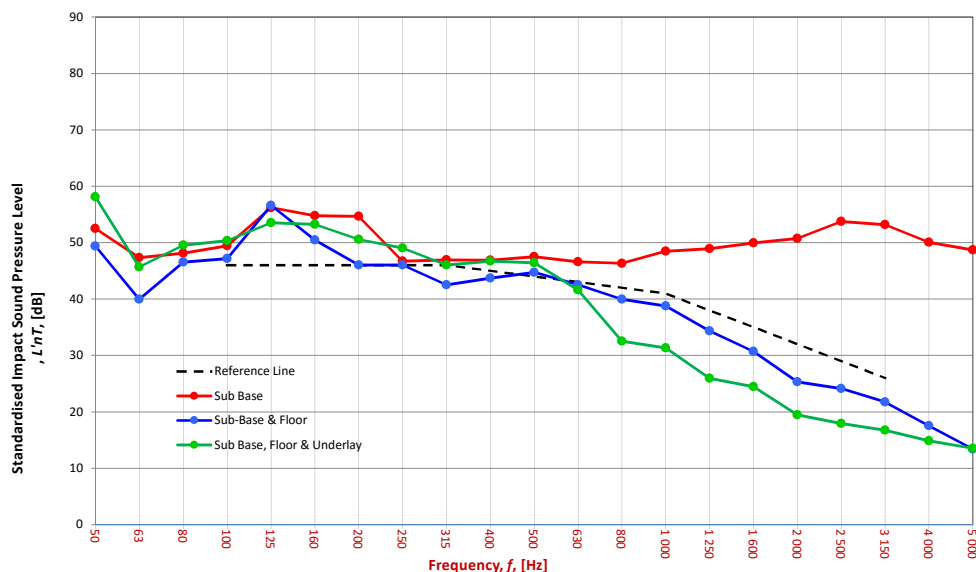
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

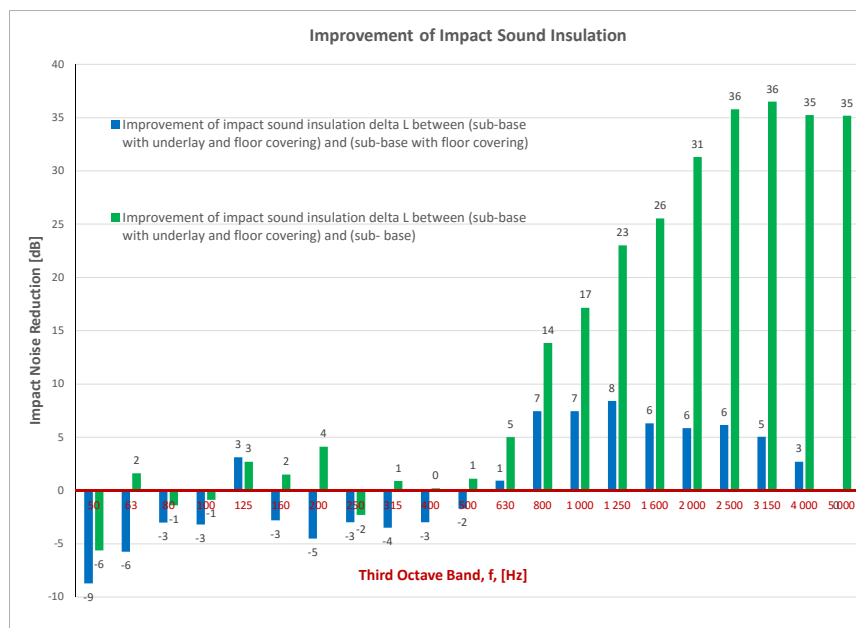
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 49.4 | 58.1 |
| 63 | 47.3 | 40.0 | 45.7 |
| 80 | 48.2 | 46.5 | 49.6 |
| 100 | 49.5 | 47.2 | 50.4 |
| 125 | 56.2 | 56.6 | 53.5 |
| 160 | 54.7 | 50.4 | 53.2 |
| 200 | 54.7 | 46.0 | 50.6 |
| 250 | 46.7 | 46.0 | 49.0 |
| 315 | 46.9 | 42.5 | 46.0 |
| 400 | 46.9 | 43.7 | 46.7 |
| 500 | 47.5 | 44.7 | 46.4 |
| 630 | 46.6 | 42.5 | 41.6 |
| 800 | 46.3 | 39.9 | 32.5 |
| 1 000 | 48.5 | 38.8 | 31.4 |
| 1 250 | 48.9 | 34.3 | 25.9 |
| 1 600 | 50.0 | 30.7 | 24.4 |
| 2 000 | 50.8 | 25.3 | 19.5 |
| 2 500 | 53.7 | 24.1 | 18.0 |
| 3 150 | 53.2 | 21.8 | 16.7 |
| 4 000 | 50.1 | 17.6 | 14.9 |
| 5 000 | 48.7 | 13.4 | 13.5 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC ★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 42 |
| Ci | 2 |
| Ci(50-2500) | 3 |
| Ci(63-2000) | 2 |
| AAAC ★ | 5 Star |
| FIC | 60 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 44 |
| Ci | 0 |
| Ci(50-2500) | 3 |
| Ci(63-2000) | 1 |
| AAAC ★ | 5 Star |
| FIC | 63 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 11)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| Description of Floor System | 15 mm Engineered Timber Flooring + 3 mm Silent Pro Underlay | 15 + 3 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

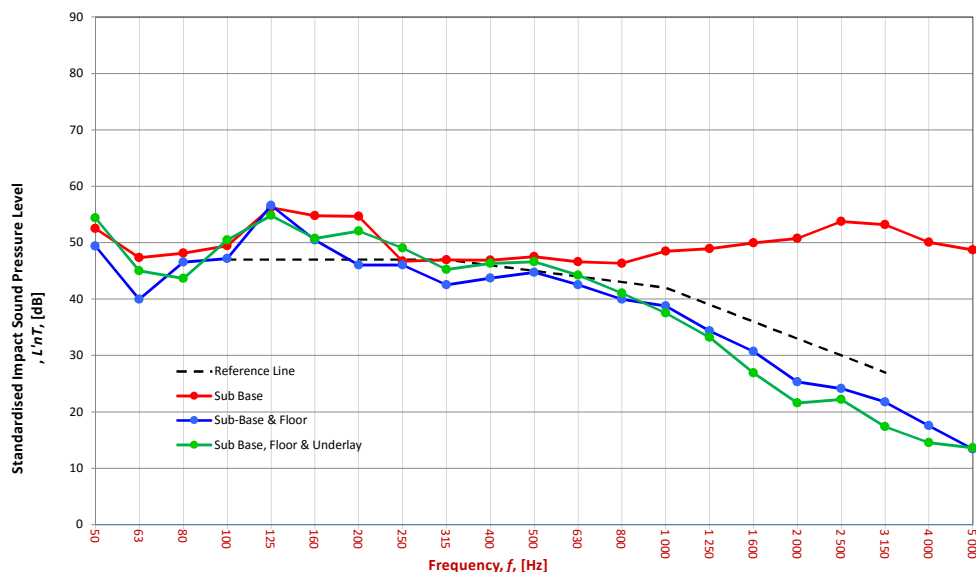
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

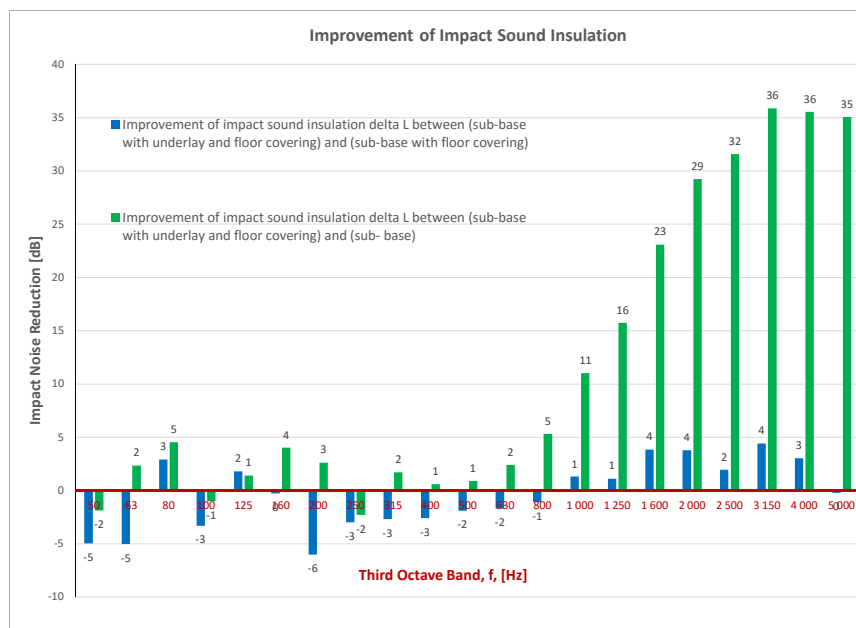
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 49.4 | 54.4 |
| 63 | 47.3 | 40.0 | 45.0 |
| 80 | 48.2 | 46.5 | 43.6 |
| 100 | 49.5 | 47.2 | 50.5 |
| 125 | 56.2 | 56.6 | 54.8 |
| 160 | 54.7 | 50.4 | 50.7 |
| 200 | 54.7 | 46.0 | 52.1 |
| 250 | 46.7 | 46.0 | 49.0 |
| 315 | 46.9 | 42.5 | 45.2 |
| 400 | 46.9 | 43.7 | 46.3 |
| 500 | 47.5 | 44.7 | 46.6 |
| 630 | 46.6 | 42.5 | 44.2 |
| 800 | 46.3 | 39.9 | 41.0 |
| 1 000 | 48.5 | 38.8 | 37.5 |
| 1 250 | 48.9 | 34.3 | 33.2 |
| 1 600 | 50.0 | 30.7 | 26.9 |
| 2 000 | 50.8 | 25.3 | 21.5 |
| 2 500 | 53.7 | 24.1 | 22.2 |
| 3 150 | 53.2 | 21.8 | 17.3 |
| 4 000 | 50.1 | 17.6 | 14.5 |
| 5 000 | 48.7 | 13.4 | 13.6 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 42 |
| Ci | 2 |
| Ci(50-2500) | 3 |
| Ci(63-2000) | 2 |
| AAAC★ | 5 Star |
| FIC | 60 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 45 |
| Ci | 0 |
| Ci(50-2500) | 1 |
| Ci(63-2000) | 0 |
| AAAC★ | 5 Star |
| FIC | 62 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |

FIELD MEASUREMENTS OF IMPACT SOUND INSULATION OF FLOORS (TEST 12)



Date of Test : Thursday, 25 February 2016
 Project No. : 2941
 Testing Company : Koikas Acoustics
 Checked by : Nick Koikas
 Place of Test: Sydney suburb
 Client : Silver Trading Timber Flooring
 Client Address : -

| | Name | Thickness (mm) | Density (SI) |
|-----------------------------|---|----------------|--------------|
| Description of Floor System | 15 mm Engineered Timber Flooring + 2 mm Silent Pro Underlay | 15 + 3 | -- |
| | 200 mm Concrete Slab | 200 | 2540 |
| | 50 mm Ceiling Cavity | 50 | -- |
| | 13 mm Plasterboard Ceiling | 13 | -- |

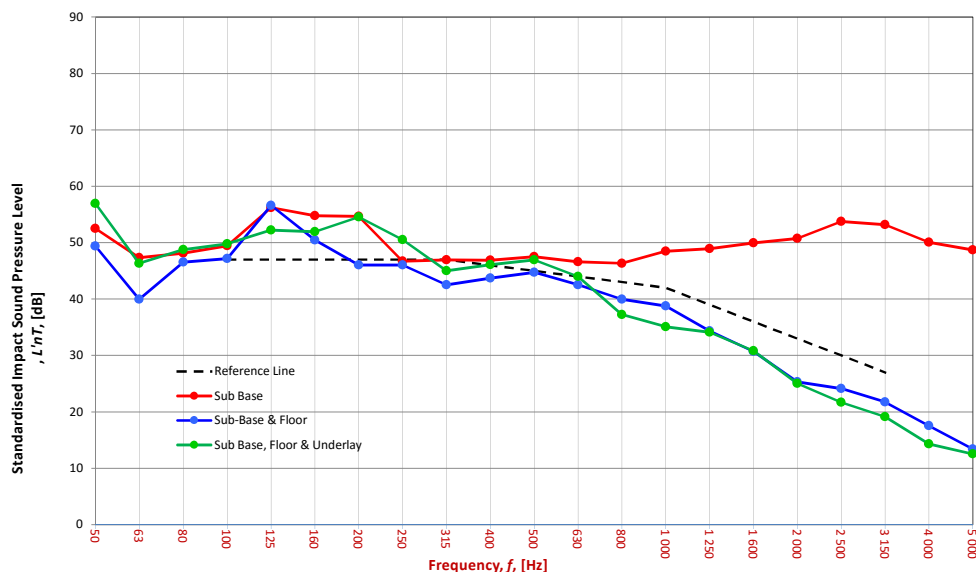
Room Dimensions
 Width : 6 m
 Length : 3 m
 Area : 18 m²

Sample Dimensions
 Width : 1 m
 Length : 1 m
 Area : 1 m²

| Receiver Rm | Location | Width | Length | Area | Height | Volume |
|-------------|-------------------------|-------|--------|------|--------|--------|
| | Living/Dining (Level 1) | 6 | 3 | 18 | 3.2 | 57.6 |

| Room Surfaces | Walls | Floor | Ceiling |
|---------------|--------------|----------|--------------|
| | Plasterboard | Concrete | Plasterboard |

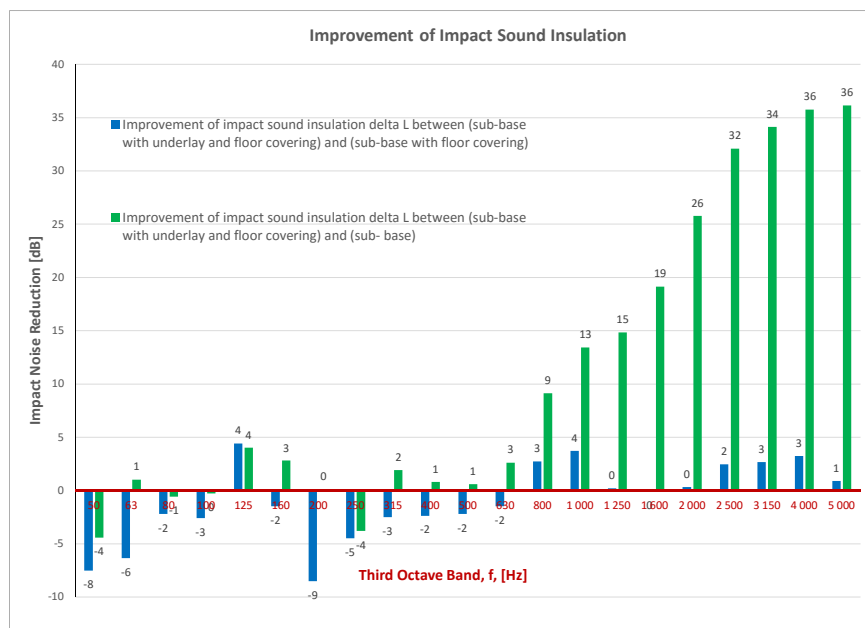
| Frequency f Hz | L'nT (one-third octave) dB | | |
|----------------------|----------------------------|----------------|-------------------------|
| | Sub Base | Sub Base Floor | Sub Base Floor Underlay |
| 50 | 52.5 | 49.4 | 56.9 |
| 63 | 47.3 | 40.0 | 46.3 |
| 80 | 48.2 | 46.5 | 48.8 |
| 100 | 49.5 | 47.2 | 49.8 |
| 125 | 56.2 | 56.6 | 52.2 |
| 160 | 54.7 | 50.4 | 51.9 |
| 200 | 54.7 | 46.0 | 54.6 |
| 250 | 46.7 | 46.0 | 50.5 |
| 315 | 46.9 | 42.5 | 45.0 |
| 400 | 46.9 | 43.7 | 46.1 |
| 500 | 47.5 | 44.7 | 46.9 |
| 630 | 46.6 | 42.5 | 44.0 |
| 800 | 46.3 | 39.9 | 37.2 |
| 1 000 | 48.5 | 38.8 | 35.1 |
| 1 250 | 48.9 | 34.3 | 34.1 |
| 1 600 | 50.0 | 30.7 | 30.8 |
| 2 000 | 50.8 | 25.3 | 25.0 |
| 2 500 | 53.7 | 24.1 | 21.7 |
| 3 150 | 53.2 | 21.8 | 19.1 |
| 4 000 | 50.1 | 17.6 | 14.3 |
| 5 000 | 48.7 | 13.4 | 12.5 |



| Sub Base | |
|-------------|--------|
| L'nT,w | 58 |
| Ci | -10 |
| Ci(50-2500) | -9 |
| Ci(63-2000) | -10 |
| AAAC★ | 2 Star |
| FIC | 44 |

| Sub Base & Floor | |
|------------------|--------|
| L'nT,w | 42 |
| Ci | 2 |
| Ci(50-2500) | 3 |
| Ci(63-2000) | 2 |
| AAAC★ | 5 Star |
| FIC | 60 |

| Sub Base, Floor & Underlay | |
|----------------------------|--------|
| L'nT,w | 45 |
| Ci | 0 |
| Ci(50-2500) | 2 |
| Ci(63-2000) | 0 |
| AAAC★ | 5 Star |
| FIC | 62 |



Definitions of Noise Metrics

FIC: Field Impact Insulation Class is a single-number rating of how well a floor system attenuates impact type sounds, such as footsteps. Calculated from third-octave band normalised impact sound pressure level data and referenced to 10 m² as described in ASTM E989. The higher the single-number rating, the better its impact insulation

L'nT,w: The Weighted Standardised Impact Sound Pressure Level when measured in situ referenced to a reverberation time (RT60) of 0.5 seconds. Used by the AAAC to determine their respective Star Rating.

Ci: Spectrum adaption term is a low frequency correction factor. Typically for massive floors such as concrete, the values are about zero while for timber joist floors Ci is positive because of the low resonant frequencies. Considers frequency range between 100 - and 2500 Hz.

Ci(50-2500): Same as above, but for the frequency range 50 - 2500 Hz.

Ci(125-2000): Same as above, but for the frequency range 125 - 2000 Hz.

| AAAC Star R. | 2 | 3 | 4 | 5 | 6 |
|--------------|--------------|-----------------|---------|------------------|--------------------|
| L'nT,w | 65 | 55 | 50 | 45 | 40 |
| FIC | 45 | 55 | 60 | 65 | 70 |
| Comments | Below BCA 62 | Clearly Audible | Audible | Barely Inaudible | Normally Inaudible |