October 3, 2024

Ameri-Tech Community Management
24701 US Hwy 19 North Suite 102
Clearwater FL 33763
Attn: Villa Serena Owners Association

Dear Villa Serena Owners Association,

EXECUTIVE SUMMARY

Introduction

The following is Keane Acoustics' acoustical review summary for Villa Serena Condominium in Riverview, FL.

It is understood your community has petitioned to change declarations to allow hard surface flooring in the 2nd floor units (currently it requires carpeting). There are (258) 2-story carriage homes (separate units upstairs and downstairs) that are 15-18 years old.

Per the blueprints, the upstairs unfinished floor is 3" poured concrete supported by 16" steel floor joists (Hambro D-500 system) and the downstairs ceiling is attached to 7/8" 25-gauge steel furring channels which are screwed into the joists. The downstairs ceiling is 5/8" gypsum (drywall). These assemblies are not a resilient-type installation. They are directly screwed in. Also, there is no sound barrier insulation above the first-floor ceiling.

Keane Acoustics has been asked to conduct a study of the current conditions at Villa Serena and evaluate acoustical impacts of any potential flooring renovations within residential units. The main focus of the study is to address the following:

- Give an opinion regarding whether an IIC and STC rating comparable to carpeting is not achievable
- Give advice on what would be the Best Alternative in terms of products, underlayment, and installation methods.

Summary of Findings

The following are a summary of the study findings.

Builder grade carpet and pad will achieve roughly IIC 70 (or possibly better) with the current floor/ceiling configuration at Villa Serena.

Just barely meeting the Building Code minimum of IIC 50 (or NISR/AIIC 45 if field tested) by a few points is not typically acceptable for most condo owners, who typically expect better than the minimum standard.

Achieving the next "notch" up of IIC 55 or NISR/AIIC 50 or higher with a hard flooring surface (tile of any type, stone, marble, wood, laminate, and even vinyl plank) is not possible with the current ceiling configuration using standard ½" thick or thinner underlayments underneath a hard floor. Based on the data shown in the report, builder grade carpet and pad is likely at least 15 IIC points better than the best underlayment options (½" thick or less) underneath vinyl plank. An improvement of 15 IIC points is perceived by most people to be about 3x quieter.

It is a common practice for flooring/underlayment manufacturers to use deceptive marketing to imply that using a thin underlayment product on its own is a viable impact noise mitigation solution. Any indications on product packaging (or by poorly informed salespeople) that an underlayment will yield a score of IIC 70 or higher without any other assembly components are completely false. Achieving a very high score without carpet and pad typically requires a thicker concrete slab and a resiliently hung drop ceiling with batt insulation (or equivalent) in the cavity.

While vinyl plank does typically score slightly better than the other aforementioned flooring materials, it is no substitute for a carpet and pad of good quality (yes, even vinyl plank with a built-in underlayment is no substitute for a carpet and pad).

For the current ceiling assembly (rigidly attached drywall with no batt insulation) at Villa Serena, achieving a laboratory score approaching IIC 60 or higher would require the installation of a built up floor system (likely involving a significant mass layer and 2+ inches) which is not possible due to either structural or dimensional limitations (or both).

Conclusion

It is Keane Acoustics' conclusion that the current floor/ceiling assembly conditions are very limiting in terms of the maximum achievable noise and vibration impact isolation, and consequently we do not recommend allowing hard surface flooring at Villa Serena as it will not remotely approach the acoustical performance of carpet and pad. Furthermore, establishing impact isolation performance criteria that will likely give rise to complaints (and potential litigation) is not recommended due to the small difference between what can be realistically achieved (likely NISR/AIIC 50) and building code minimum (NISR/AIIC 45).

Please feel free to contact me if you have any comments/questions.

Best regards,

Michael Keane, P.E.
President – Keane Acoustics, Inc.

Michael is a voting member on the American Society for Testing and Materials (ASTM) E33 Committee on Building and Environmental Acoustics. This is the committee that is responsible for the ASTM test standards (such as E1007) for acoustical field testing of the floor ceiling assemblies, including occasional revisions and updates of the testing standards.

Report Outline

This report will be broken down as follows

- Noise Criteria
  - Building Code
  - Federal Guidelines
  - ASTM Testing Standards
- Floor Ceiling Assembly Performance
  - Laboratory Test Data
  - Field Test Data
- Discussion of Options available to Villa Serena
  - Carpet and Pad
  - Best Possible Assembly (and why it isn't realistic)
  - Best Possible Assembly with no demolition
  - Best Possible Assembly with demolition
- Conclusion

Noise Criteria

Building Code
It is understood that Villa Serena was built 2006-2009. The 2006 code states the following regarding noise:

> ***1207.2 Air-borne sound.***
> *Walls, partitions and floor/ceiling assemblies between dwelling units from each other or from public or service areas shall have an sound transmission class (**STC**) rating of not less than 50 (45 if field tested) when tested in accordance with ASTM E 90.*
>
> ***1207.3 Structure-borne sound.***
> *Floor/ceiling assemblies between dwelling units or between a dwelling unit and a public or service area within the structure shall have an impact insulation class (**IIC**) rating of not less than 50 (45 if field tested) when tested in accordance with ASTM E 492.*

For reference ASTM E 492 and E 90 are laboratory tests. The field equivalents are ASTM E1007 and E 336.

The current 2024 International Building Code states the following regarding impact noise:

1206.3 Structure-Borne Sound
Floor-ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492. Engineering analysis shall be performed by a registered design professional.

Note that NISR is one of two metrics commonly used for field testing per ASTM E1007 (the other metric is AIIC). Both of these metrics will be discussed later in this report.

Federal Guidelines

The Federal Housing Administration has listed both impact and airborne sound requirements via its HUD guide for multifamily dwellings. The "Guide to Airborne, Impact, and Structureborne Noise Control of Multifamily Dwellings" divides buildings into three grades described as Luxury, Average, and Minimum (Grades I, II, and III, respectively) which correspond to the anticipated interior background noise levels.

For living areas located above living areas and bedrooms located above bedrooms the recommended STC and IIC ratings are as follows:

Luxury (Grade I) – STC and IIC 55 – corresponds to background noise of 32 dBA
Average (Grade II) – STC and IIC 52 – corresponds to background noise of 37 dBA
Minimum/Noisy (Grade III) – STC and IIC 48 – corresponds to background noise of 42 dBA

These Grade designations were originally devised in order to determine acceptable criteria for various population density scenarios (Quiet/Rural, Suburban, Urban/Noisy, etc.). It must be stressed that the use of this guide for purposes of this report is to connect the importance of background noise with impact and airborne noise.

With ample masking from background noise many noise events will either be inaudible, non-distinct, and most likely tolerable depending on the noise mitigation offered by the construction of the floor/ceiling, walls, etc.

The background noise measured in similar condominium buildings is typically 20-25 dBA with the air conditioning off. These conditions are 8-10 quieter than the top HUD Grade 1 (Luxury) which requires wall partitions and floor/ceiling assemblies to perform significantly better than the STC and IIC 55 guidelines. Mathematically extrapolating the HUD guidelines to account for the lower background noise in the tested units would yield a requirement of STC/IIC 60-61 to meet the intent of the HUD guidelines.

International Code Council

The International Code Council recommends the following grades of performance

Test Location	Airborne Noise "Acceptable" Grade B	Airborne Noise "Preferred" Grade A	Impact Noise "Acceptable" Grade B	Impact Noise "Preferred" Grade A
Laboratory	STC 55	STC 60	IIC 55	IIC 60
Field	NNIC 52	NNIC 57	NISR 52	NISR 57

Note the recommended NISR values in the table above are 3 points less than the laboratory IIC values. The NISR metric for impact noise is becoming the more prevalent field testing metric (as opposed to AIIC), which will be discussed later in this report.

ASTM Testing Standards

Impact Sound

ASTM and Building Code
Impact testing is conducted in accordance with ASTM Designation E1007. The previous terminology Field Impact Insulation Class (FIIC) rating has been replaced with Apparent Impact Insulation Class (AIIC) and Normalized Impact Sound Rating (NISR) via a more recent revision of the standard. These metrics have replaced the FIIC to "make clear that the quantity includes flanking". Flanking paths are other avenues in which sound can travel, and can include doors, windows, piping, ductwork, wall/ceiling/floor penetrations, and other partitions in the room that are better coupled to the structure. The AIIC rating takes account of the amount of sound absorbing finishes in the space. The NISR rating is "normalized" to the response the rooms would have if they were typically furnished. The NISR rating is often used when a room is unfurnished. As the reverberation time (RT60) in the room is approaches 0.5 seconds, the AIIC and NISR scores will become the same (or very close to one another). The Current 2024 IBC version lists NNIC and NISR as the appropriate field metrics to enforce the minimum sound and impact transmission rating requirements for multi-family residential buildings.

Keane Acoustics prefers the AIIC over the NISR, since voluminous open plan rooms with a hard surface floor tend to be more reverberant (with an RT60 well over 0.5 seconds). In these instances, the NISR score will be notably higher than the AIIC. The NISR score for open plan living rooms tends to be notably higher than a score in a bedroom with identical assembles, where often the living room score will meet code when the bedroom score will not.

Just barely meeting the Building Code minimum of IIC 50 (or NISR/AIIC 45 if field tested) by a few points is not typically acceptable for most condo owners, who typically expect better than the minimum standard. The general rule of thumb is to expect a field test score of about 5 points lower than the laboratory score. While an NISR score of 45 meets building code, many residents (especially those used to their upstairs neighbors walking on carpet) will find the resultant noise unacceptable with an NISR score of 45.

If the unit directly above has a floor/ceiling assembly at the threshold of meeting code, typical activities experienced in the unit underneath are as follows.

- Clear audibility of heavier footfall noise with moderate background noise (A/C, TV or music system on).
- Clear audibility of lighter impact noises when background noise is low (A/C, TV or music system off).
- It is sometimes possible to follow the path of the person walking in the unit above.

Air Borne Sound

Air Borne (Televisions, music systems, loud talking, etc.) testing is conducted in accordance with ASTM Designation E336. The previous terminology Field Sound Transmission Class (FSTC) rating has been clarified to be used for testing only when flanking paths do not exist. Given that eliminating flanking paths in a residence is very challenging, the Apparent Sound Transmission Class (ASTC) or Normalized Noise Isolation Class (NNIC) account for flanking and have become the standard field sound transmission test methods.

Note that the NNIC/ASTC rating is not significantly influenced by the floor surface and underlayment and thus is not covered in great detail in the report. In typical residential settings, the NISR/AIIC rating is of much more concern than the NNIC/ASTC rating.

Review of Test Scores for Hambro Systems

Keane Acoustics has compiled a number of test scores from both laboratory and field tests (including some of Keane Acoustics' own tests). The compiled test scores for Hambro D-500 systems (which is the same system installed at Villa Serena) are as follows.

Flooring	Underlayment	Slab Thickness (inches)	Insulation in cavity?	Drywall attachment	IIC rating
Laboratory Test Scores					
none	none	2.5	no	rigid	26
carpet	44oz carpet pad	2.5	no	rigid	~70
hardwood	¼" cork	2.5	no	rigid	47
ceramic tile	10mm Regupol	2.5	no	rigid	46
laminate	Quiet Walk	2.5	no	rigid	45
various	1.5" Maxxon Gypsum over Enkasonic	2.5	no	rigid	53-55
ceramic tile	Pliteq RST-02	4	yes	GenieClip	56
Field Test Scores					
carpet	carpet pad (good quality)	3-3.5	yes	2 layers of QuietRock ES with GenieClip	82 (AIIC)
ceramic tile	Mapeguard 2 (40 mil thick)	3-3.5	yes	2 layers of QuietRock ES with GenieClip	51 (AIIC)
ceramic tile	Mapeguard 2 (40 mil thick)	3-3.5	yes	2 layers of QuietRock ES with GenieClip	47 (AIIC)
tile	Reported as none*	3-3.5	Icynene foam	Partially rigid	50(AIIC)
tile	Reported as none*	3-3.5	Icynene foam	Partially rigid	47(AIIC)
stone	none	3-3.5	Icynene foam	Partially rigid	43(AIIC)
stone	none	3-3.5	Icynene foam	Partially rigid	44(AIIC)

* Flooring reported as having no underlayment likely had some form of underlayment.

Exhibits A-C show selected laboratory test results from the chart above.

Discussion

Carpet and Pad

Carpet and pad is unsurpassed in terms of mitigating footfall and other impact noises in an affordable and lower profile system.

Typical test scores for carpet and pad flooring are IIC 70 or higher (sometimes in excess of IIC 80). See Exhibit D for carpet and pad score data for both wood and concrete floor/ceiling assemblies (Hambro scores sit in the between concrete and wood frame assemblies, but closer to wood). In this IIC +/- 70 score range, the unit below experiences very little disturbance from the activities discussed above, short of very heavy footfalls or running, jumping, etc.

(Theoretically) Best Performing Assembly for Villa Serena (and why it isn't realistic)

Built Up Floors
For the current ceiling assembly (rigidly attached drywall with no batt insulation) at Villa Serena, achieving a laboratory score of IIC 60 or higher would require the installation of a built up floor system (likely involving a significant mass layer and 3+ inches) which is not possible due to either structural or dimensional limitations (or both). These types of systems are much more expensive than a thin underlayment or carpet and pad. For reference, the 2" Maxxon/Enkasonic (see table on previous page) assembly tops out at about IIC 55.

There is no published (or field) data for these 3" + assemblies, as the manufacturer is unlikely to spend money on such an impractical assembly. In conclusion, it is unlikely that the performance of carpet and pad would be met with anything that could actually be installed.

Limitations of Resilient Ceilings
Based on the data shown in table on the previous page, a real world (not laboratory) installed resilient ceiling does not necessarily yield a dramatic improvement in IIC score. While the GenieClip ceiling lab test (See Exhibit C) shows a 10 point (decibel) improvement over a rigidly attached ceiling, it is nowhere near the 25+ point improvement that a carpet and pad would yield. For a point of reference, most people perceive a 10 decibel change as a factor of two and a 25-30 decibel improvement as a factor of 5 or 6.

Keane Acoustics' experience field testing Hambro systems with GenieClips shows a real world improvement of about 6-7 points (roughly a 30% perceived change), which is noticeable but fairly modest compared to the performance of carpet and pad.

Best Possible Assembly with/without Demolition

Achieving the next "notch" above IIC 55/AIIC 50 or higher with a hard flooring surface (tile of any type, stone, marble, wood, laminate, and even vinyl plank) is not possible with the current ceiling configuration using standard ½" thick or thinner underlayments underneath a hard floor.

While vinyl plank is typically the best "hard" floor surface and is recommended when carpet isn't an option, it only scores slightly better than the other aforementioned "hard" flooring materials (typically 1-4 points better). Therefore vinyl plank is no substitute for a carpet and pad

of good quality (yes, even vinyl plank with a built-in underlayment is no substitute for a carpet and pad).

Buyer Beware (misleading information)

It is a common practice for flooring/underlayment manufacturers to use deceptive marketing to imply that using a thin underlayment product on its own is a viable impact noise mitigation solution. See Exhibit E for an example of a "big Box" store website that reports very high test scores, without explaining that the rest of the assembly is responsible for such a high score.

Any indications on product packaging (or by poorly informed salespeople) that an underlayment will yield a score of IIC 70 or higher without any other assembly components are completely false. Achieving a very high score without carpet and pad typically requires a thicker concrete slab and a resiliently hung drop ceiling with batt insulation (or equivalent) in the cavity. Resilient ceilings often do not perform nearly as well as those in a (prefect) laboratory setting, due to the effects of "flanking paths" (such as ductwork, doors, windows, wall/ceiling penetrations, etc.)

Conclusion

In conclusion, the existing Hambro D-500 construction with a rigidly attached drywall ceilings below, offers minimal inherent impact noise mitigating properties. This dearth of acoustical performance will be exacerbated with the removal of the carpet and pad and with subsequent replacement of any hard flooring surface (with or without underlayment).

Based on a review of numerous test reports and data, Keane Acoustics does not recommend allowing hard surface flooring at Villa Serena as it will not remotely approach the acoustical performance of carpet and pad.

In addition, establishing impact isolation performance criteria that will likely give rise to complaints (and potential litigation) is not recommended due to the small difference between what can be realistically achieved (likely AIIC 50) and building code minimum (NISR/AIIC 45).

Please feel free to contact me if you have any comments/questions.

Best regards,

Michael Keane, P.E.
President – Keane Acoustics, Inc.

See Exhibit F for the CV of Michael Keane, P.E.at the end of this report

Hambro D500 Composite Floor System

ACOUSTICAL PROPERTIES

SOUND TRANSMISSION CLASS (STC)

The STC is a rating that assigns a numerical value to the sound insulation provided by a partition separating rooms or areas. The rating is designed to match subjective impressions of the sound insulation provided against the sounds of speech, music, television, office machines and similar sources of airborne noise characteristic of offices and dwellings.

Here are the guidelines for a sample of STC ratings:

STC Rating	Practical guidelines
25	Normal speech easily understood
30	Normal speech audible, but not intelligible
35	Loud speech audible, fairly understandable
40	Loud speech audible, but not intelligible
45	Loud speech barely audible
50	Shouting barely audible
55	Shouting inaudible

IMPACT INSULATION CLASS (IIC)

The Impact Insulation Class (IIC) is a rating designed to measure the impact sound insulation provided by the floor/ceiling construction. The IIC of any assembly is strongly affected by and dependent upon the type of floor finish for its resistance to impact noise transmission.

ACOUSTICAL PERFORMANCES

The result in the following table have been obtained following laboratory testing. Field testing may vary depending on the quality of the assembly and the various materials used. Note that the minimum design slab thickness for Hambro D500 system is 3 in.

Hambro assemblies				STC	IIC	Laboratory
Assembly	Slab thickness (in.)	Gypsum thickness (in.)	# of gypsum layer			
	2½	½	1	53	26	NGC Testing Services Buffalo, NY, USA www.ngctestingservices.com
	2½	⅝	1	57	30	National Research Concil Ottawa, ON, CA http://www.nrc-cnrc.gc.ca
	4	½	1	N/A	32	NGC Testing Services Buffalo, NY, USA www.ngctestingservices.com
	4	½	2	63	36	NGC Testing Services Buffalo, NY, USA www.ngctestingservices.com

Exhibit A – Hambro Published IIC Laboratory Test Scores (page 1)

Note these are scores without any flooring or underlayment

Acoustical Properties

Sound Transmission

Because sound transmission depends upon a number of variables relating to the installation and materials used, Hambro makes no representations about the sound transmission performance of its products as installed. You should consult with a qualified acoustical consultant if you would like information about sound performance.

Acoustical Consultants

The following is a list of readily accessible acoustical consultants found on the World Wide Web, and is not a recommended list. Hambro has not researched their qualifications and cannot make any representation about their abilities.

Archicoistics/Acoustinet
Claude Venet
7725 NW 25th St., #300
Miami FL 33122
305-981-2500

Bertram Y. Knizey Jr.
212 SW 42nd Street
Gainesville, FL. 32607
352-378-1878

Dunn & Associates
P.O. Box 121308
Clermont, FL 34711
352-394-0621

Fagen Acoustical Consultants
P.O. Box 1975
St. Petersburg, FL 33701
727-823-3564

Octave Acoustique, Inc.
Christian Martel, M.Sc. Arch
963, chemin Royal
Saint-Laurent-de-l'Ile-d'Orleans
(Québec) Canada G0A 4N0
418-844-3338

Pelton Marsh Kinsella
4045 Sheridan Ave.,
Suite 420
Miami Beach, FL 33140
305-381-6970

Siebein Associates, Inc.
625 NW 60th Street
Suite C
Gainesville, FL 32607
352-331-5111

Siebein Associates and Octave Acoustique have worked directly for Hambro and some of our customers.

Hambro Sound Information

Hambro Assemblies	STC	IIC
2 1/2" slab, 1 layer 1/2" drywall	52	26
3" slab, 1 layer 1/2" drywall	57	30
4" slab, 1 layer 1/2" drywall	58	32
4" slab, 2 layer 1/2" drywall	60	36

Completed Hambro floor/ceiling assemblies are available for additional floor finishes testing at NGC. Contact NGC directly or Jerry Rhodes, Hambro, at **jerry.rhodes@hambro.ws.**

Impact of Floor Finishes & Hambro Floor System

Floor Finishes	IIC Ratings
~~Carpet and Pad~~	~~50~~
Homasote 1/2" comfort base under wood laminate **www.homasote.com**	44
6 mm cork under engineered hardwood	47
Dodge Regupol 4010 10 mm underlayment under ceramic tile **www.regupol.com**	46
Quiet Walk underlayment under laminate flooring **www.mpglobalproducts.com**	45
Insulayment under engineered wood **www.mpglobalproducts.com**	46
1 1/2" Maxxon gypsum underlayment over Enkasonic sound control mat with quarry tile over Noble Seal SIS **www.maxxon.com**	54
1 1/2" Maxxon gypsum underlayment over Enkasonic sound control mat with wood laminate floor over silent step **www.maxxon.com**	55
1 1/2" Maxxon gypsum underlayment over Enkasonic sound control mat w/Armstong Commissions Plus Sheet Vinyl **www.maxxon.com**	53

** All products tested were on a 2 1/2" Hambro slab with a one layer 1/2" drywall ceiling. This chart is provided as a reference. The calculations of sound rating and design of floor/ceiling assemblies with regard to acoustical properties is a building designer/specialty engineering responsibility. Actual field results may vary depending on installation and materials. All product tests were performed at NGC Testing Services, Buffalo NY, www.ngctestingservices.com*

STC Ratings: What They Mean

STC Rating	Practical Guidelines
25	Normal speech easily understood
30	Normal speech audible, but not intelligible
35	Loud speech audible, fairly understandable
40	Loud speech audible, but not intelligible
45	Loud speech barely audible
50	Shouting barely audible
55	Shouting inaudible

HAMBRO® Proven Residential Building Systems

1

Exhibit A – Hambro Published IIC Laboratory Test Scores (page 2)

Note the carpet and pad IIC rating is crossed out as this is much lower than other reported tests which are in the IIC 70 range. Also note all of these assemblies without the built-up Maxxon gypcrete system do not meet Building Code!

Structure I - 1-1/2" Gypcrete over Enkasonic sound Matting with Hambro D500 Composite Floor Joist System - Flooring on 1-1/2" nominal Maxxon gypsum concrete over 0.4" Enkasonic Sound Control Matting over 2-1/2" nominal reinforced concrete integrated with top chord of 8" open web steel beams 4'oc with 25 gauge steel hat channel 16" oc perpendicular to beams with ½ " type C wallboard attached to 12" oc furring with 1-1/8" type S screws. The wallboard joints were taped & the outer perimeter was sealed with acoustical caulk.
TEST - Impact Sound Transmission
TESTING LABORATORY - NGC

Product	IIC
Commissions Plus	53
Quarry Tile	54

PRODUCT	Test Date	Report No.	FREQUENCY, Hertz (cps)																Insulation Class (IIC)
			100	125	160	200	250	315	400	500	630	800	1,000	1,250	1,600	2,000	2,500	3,150	
Commission Plus	11/10 /04	NGC 7004079	67	62	66	66	63	61	57	52	51	49	47	43	38	36	36	29	53
Quarry Tile	11/08 /04	NGC 5004027	31	31	33	39	41	45	53	59	62	61	65	69	72	72	69	71	54

Exhibit B - Hambro Published IIC Laboratory Test Scores

Note this data matches the data from Exhibit XX

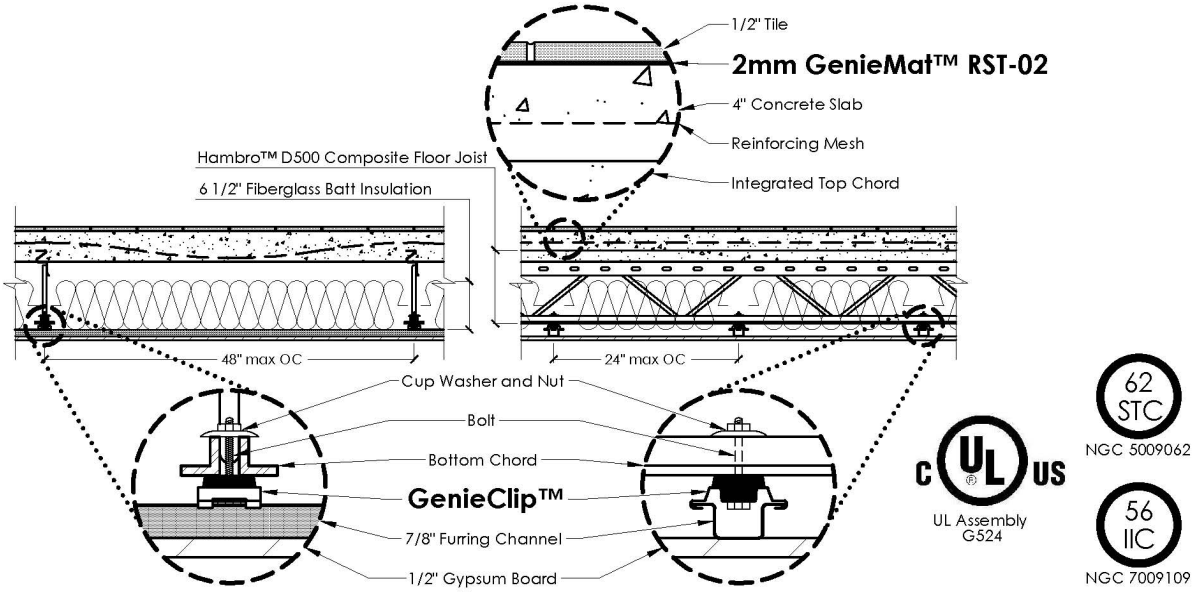


Exhibit C –Published IIC Laboratory Test Scores of Hambro System – ceiling mounted with GenieClips.

Note the improvement is about 10 points better than a similar test from Exhibit XX. Field data taken by Keane Acoustics and other Florida consultants fall about 5 points lower (AIIC 51) than this laboratory score of IIC 56.

In Test B-1 the impact noise transmission of several carpet cushion and cushion types was conducted on a concrete slab floor-ceiling assembly. Following are the carpet construction details used in this series of tests.

CARPET KEY					
Carpet	Type	Surface	Pile Wt. oz/sq yd	Pile Ht. inches	Fiber Content
1	tufted	H-L loop	20	.15-.35	wool
2	tufted	loop	27	.20	olefin
3	tufted	cut	32	.56	nylon
4	tufted	cut	36	.44	acrylic
5	tufted	loop	40	.25	wool
6	woven	loop	44	.25	wool
7	tufted	loop	60	.25	wool
8*	woven	loop	44	.25	wool
*with attached 3/16 inch sponge rubber cushion					

Following are the test results of the above carpets on a concrete slab floor-ceiling assembly.

TEST B-1 Concrete Slab Floor-Ceiling Assembly			
Carpet	Cushion	INR Impact Noise Rating	IIC Impact Insulation Class
Bare Floor	---	-17	34
1	none	+2	53
2	none	+4	55
3	none	+6	57
4	none	+8	59
5	none	+9	65
6	none	+14	68
7	none	+18	70
8	attached 3/16 inch sponge rubber	+17	69
6	40 oz/sy yd hair-jute	+22	73
6	polyurethane foam	+24	76
6	44 oz/sy yd sponge rubber	+25	79
6	31 oz/sy yd 3/8 inch foam rubber	+28	79
6	80 oz/sy yd sponge rubber	+29	80

Observations: B-1

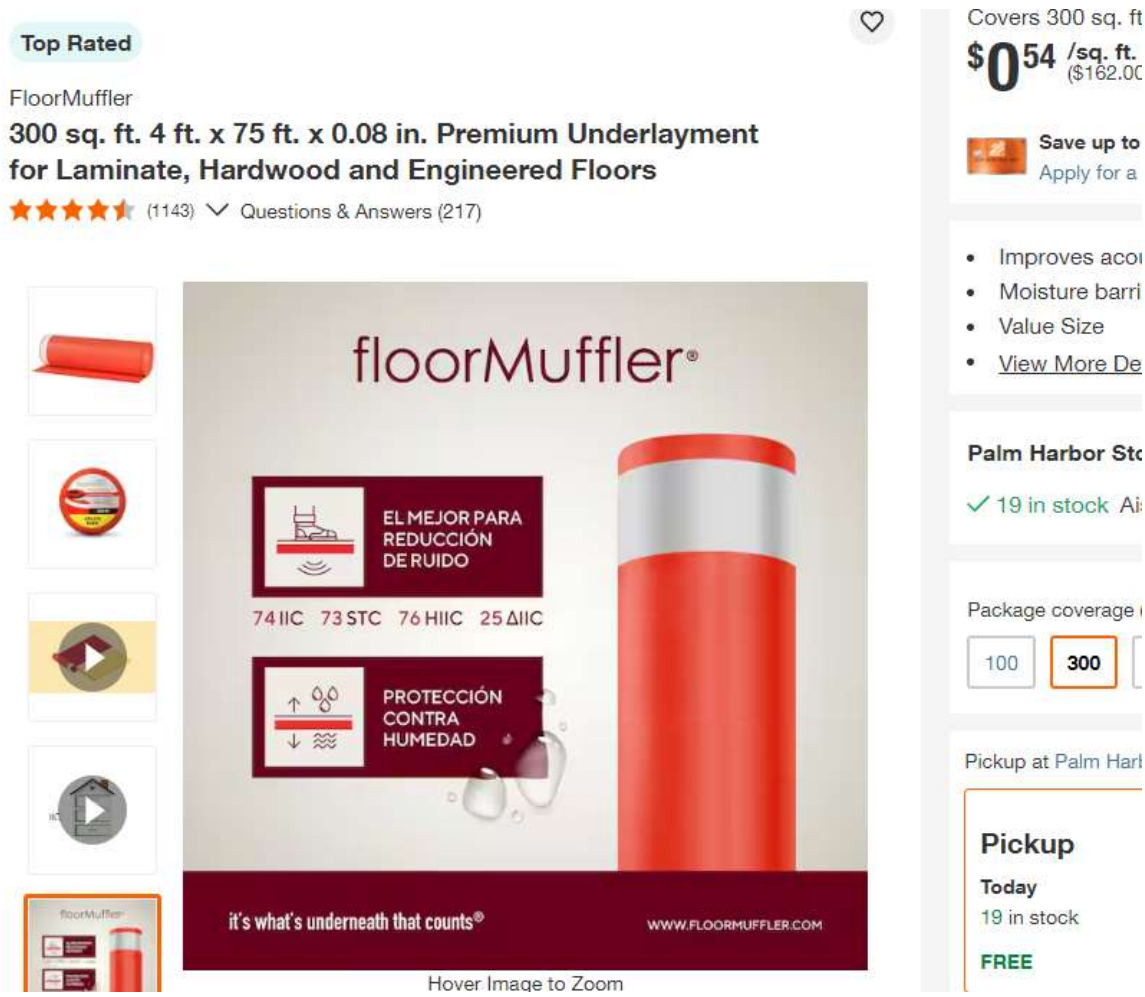
1. In the carpet test without cushion, carpet with the greater pile weights scored the highest INR.
2. In the carpet test with cushion, the order of efficiency shifted. Sponge rubber cushion, which had the lowest NRC characteristic, scored the highest INR.
3. In these tests, weight for weight, foam rubber cushion delivered the larger INR number.
4. Cushion materials, in general, add significantly to increased INR values.

Test Series B-2. Carpet samples 6 and 8 were selected and tested on a standard wood joist floor-ceiling assembly with a 5/8 inch tongue and groove plywood subfloor.

TEST B-2 Wood Joist Floor-Ceiling Assembly			
Carpet	Cushion	INR Impact Noise Rating	IIC Impact Insulation Class
Bare Floor	--	-19	32
8	attached 3/16 inch sponge rubber	+3	54
6	40 oz/sy yd hair-jute	+10	61
6	polyurethane foam	+12	63
6	44 oz/sy yd sponge rubber	+14	65
6	31 oz/sy yd 3/8 inch foam rubber	+16	67
6	80 oz/sy yd sponge rubber	+17	68

Exhibit D – Laboratory ICC tests using Carpet and Pads of Different Densities

Note that the performance of foam/rubber is fairly similar, where a higher density only yielding a small improvement.



Highlights

- For use with Laminate, Engineered, Solid Hardwood and Rigid Core (5mm or thicker) flooring systems, in Floating, Nail Down, and Double Glue Down applications.
- ACOUSTICAL PERFORMANCE: Highest acoustic ratings on the market: HIIC up to 76, IIC up to 74 dB, STC up to 73 dB, Delta IIC up to 25 dB.

Note that this website shows no actual test reports……..

Exhibit E– Examples of products from "Big Box" stores that report misleading information