


# “Sound Advice”

**(About Things You Don't Want to Hear)**

**Presented by Jim Medina**

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## Session Description

- This presentation will provide the architect and specification writer with a thorough understanding and framework of knowledge with regard to "best practices", industry standards, product performance variables, and the "do's and don'ts" associated with successful sound isolation on ceramic tile & natural stone installations.
- At the conclusion of the presentation, the attendee will be armed with the information to identify the scenarios where sound isolation will be required as well as which products and installation methods will be most suited to the sound isolation demands unique to a particular project.

## Learning Objectives

- We will explore the origins and history of sound isolation demands as they relate to ceramic tile & natural stone installations .
- We will explore relevant ANSI & ASTM standards, as well as NTCA & TCNA standards which address the requirements associated with effective sound isolations.
- Identify sound isolation shortcomings, performance variables, misconceptions, and failure commonalities which can occur.
- Review "best practices" with regard to sound isolation specifications, details, and installation methods.
- Examine additional evaluation and test methods.

## "SOUND ADVICE"

What do we mean by "sound isolation"?

Sound Isolation is not "sound proofing"

- The chief concern is impact noise... from overhead
- Impact noise is footfalls, chair legs banging, balls bouncing
- Loud music, voices, TVs blaring, etc. is addressed elsewhere
- The goal is to minimize the most intrusive frequencies




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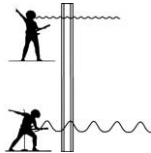
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## "SOUND ADVICE"

What do we mean by "sound isolation"?

"Impact Insulation Class" (IIC) has been the historic metric

- Rates the insulating properties of the floor/ceiling assembly
- Scale of measurement is logarithmic
- Loud music, voices, TVs blaring, etc. is addressed elsewhere
- UBC is a "recommended" 55... FIIC has been reimagined, and HIIC has arrived




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## "SOUND ADVICE"

Where do you need sound isolation?

Condominiums, multi-family, some hospitality are prime users

- Building codes require certain level of sound isolation
- Higher-end hospitality can specify sound isolation
- Residential/large custom homes occasionally use sound isolation




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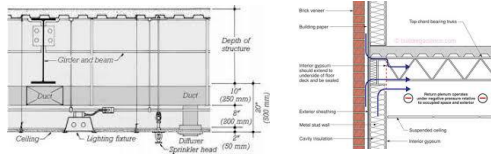
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## "SOUND ADVICE"

Where do you need sound isolation?

**Why the conventional IIC metric falls short for evaluation**

- "Real world" site conditions vary
- Variations make it difficult to establish a uniform baseline
- No uniform baseline leads to comparative inequality




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## "SOUND ADVICE"

What are the relevant test methods?

**E2179 is the test method that prevails today**

- Test results reflect the contributing value of the product... only
- Product IIC value is added to IIC value of the ceiling/floor assembly for a total system
- E2179 takes a precedence over conventional IIC results

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## "SOUND ADVICE"

What are the relevant test methods?

**HIIC is a new metric... now part of the evaluation process**

- This is a new ASTM classification of high frequency Impact sound ratings
- ASTM E3222 is the "new" active standard for determining "high frequency" values
- Existing IIC ratings can be skewed by frequency bands below 400 Hz

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## "SOUND ADVICE"

What are the relevant test methods?

HIIC is a new metric... now part of the evaluation process

- "High Frequency" refers to bands from 400 to 3150 Hz
- Common sources of these impact hard heeled impact, dragging furniture, dog toenails and dropped objects on hard surfaces
- Existing ratings are not representative of impact insulation at high frequencies

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## "SOUND ADVICE"

What are the relevant test methods?

HIIC is a new metric... now part of the evaluation process

- High Frequency impact ratings can be calculated from existing test reports
- Allows the design professional identify "floor topping products" that will affect the level of high frequency impact sound
- This classification DOES NOT REPLACE standard IIC ratings, nor can it be used to determine IIC values

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## "SOUND ADVICE"

What are the relevant test methods?

HIIC is a new metric... now part of the evaluation process

**High frequency ratings should be reported...*alongside* existing ratings.**

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## "SOUND ADVICE"

Table 2 - Single number ratings for some common German floor assemblies.

Condition	$L_{eq}$	HC	HHC
Typical living space	44	62	75
Shower system 1	49	56	71
Shower system 2	59	71	72
Lightweight stair	40	66	81
Heavyweight stair, isolated	38	72	70
Heavyweight stair, uninsulated	69	38	39

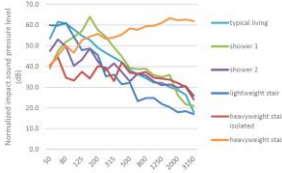


Figure 3 - Impact spectra of the German floor-ceiling assemblies shown in Table 2.

## "SOUND ADVICE"

What are the relevant test methods?

"AIRC" has now replaced "FIIC" as the more comprehensive "field" test

**The combined data of ASTM E1007-14 & ASTM 336-14 are represented in "AIRC" field data results.**

## "SOUND ADVICE"

What are the relevant test methods?

"AIRC" has now replaced "FIIC" as the more comprehensive "field" test

**Any "FIIC" field data points/ASTM 1007-14 are still viewed as relevant if performed prior to the advent of the "AIRC" measurement.**

## "SOUND ADVICE"

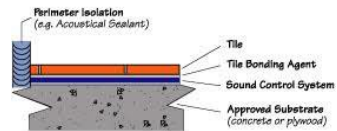
What is used to provide sound isolation value?

**Sound isolation is typically an underlayment**

- It is the interface between the hard surface and the substrate
- Compressive strength is an issue that can be a factor
- Other benefits may be available besides sound isolation



### Sound Rated Floor Assembly




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## "SOUND ADVICE"

What is used to provide sound isolation value?

**Cork is a legacy sound isolation underlayment**

- Cork can have compression, moisture retention, and point loading concerns
- Can provide crack isolation properties
- No waterproofing benefits with cork




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## "SOUND ADVICE"

What is used to provide sound isolation value?

**Crumb rubber is a sound isolation underlayment**

- Made from ground up old tires
- Can provide crack isolation properties
- No waterproofing benefits with crumb rubber
- Test to validate compression would be advisable




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## "SOUND ADVICE"

What is "sound isolation"?

**Sound Isolation is typically an underlayment**

- Bituminous "peel & stick" is a legacy sound isolation solution
- Compressive strength is an issue
- No waterproofing assurances are touted; primer required




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## "SOUND ADVICE"

What is "sound isolation"?

**Sound Isolation is typically an underlayment**

- Thermoplastic sheet membrane for sound iso...
- Typically PVC or CPE based products
- Some products may offer crack isolation and waterproofing




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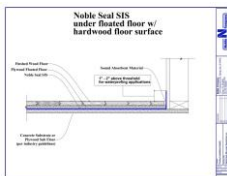
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## "SOUND ADVICE"

**Sound Isolation, waterproofing, and crack isolation**

- 6' x 33.3" (200 sf) per roll
- Legacy CPE technology and quality
- One of the few sound iso products compatible w/LVT




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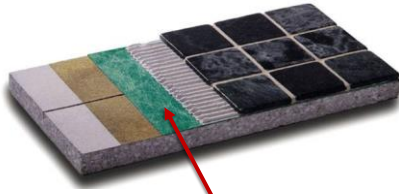
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## "SOUND ADVICE"



Sound reduction membrane

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## "SOUND ADVICE"

What is "sound isolation"?

**Sound Isolation is typically an underlayment**

- Composite EPS foam sheet membranes
- Recycled cotton fiber cloth compressed mat
- Trowel applied sound iso products




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## "SOUND ADVICE"

**What gets installed over sound iso?**

- Ceramic Tile
- Natural Stone
- Hardwood
- Luxury Vinyl Tile

**Where does sound iso get installed**

- Residential/Condo
- Student Housing
- Certain Hospitality applications

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## "SOUND ADVICE"

### Standard for Sound Rated Floors

ANSI A118.13 is the standard for bonded, sound reduction membranes. It includes the following:

- Acoustical performance
  - ASTM E492
  - ASTM E2179
- Crack isolation
  - ANSI A118.12
  - ASTM C627




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## "SOUND ADVICE"

### Standard for Sound Rated Floors

ANSI A118.13 is the standard for bonded, sound reduction membranes. It includes the following:

- Acoustical performance
  - ASTM E492
  - ASTM E2179
- Crack isolation
  - ANSI A118.12
  - ASTM C627




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## "SOUND ADVICE"

### Performance Variables

- Sound Transmission Class (STC) - What does this mean?
- Impact Insulation Class (IIC) - What does this mean?

#### STC = Airborne Noise



#### IIC = Impact Noise




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## "SOUND ADVICE"

### Performance/Cost Variables

- **Compression...** why is this important?
- **Crack isolation...** is different then compression issues
- **Waterproofing...** most sound isolation does not offer waterproofing




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## "SOUND ADVICE"

### Membrane that lacks compressive strength




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## "SOUND ADVICE"

### Membrane that lacks compressive strength




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## "SOUND ADVICE"

### Who is the customer?

- Architect
- Condo Owner
- Condo Association
- Distributor
- Installer

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## "SOUND ADVICE"

### How does acoustic testing affect the customer?

- Architects
  - Designing for building code
  - What is code?
  - What rating does the building require?
  - What rating does the architect desire?

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## "SOUND ADVICE"

### Condo Owners vs. Association

- Condo Owner
  - Remodel or new construction
  - Do they know local code requirements?
  - Is the required STC or IIC desired or required?
  - Is the number realistic?

*"H.O.A.'s often set unrealistic IIC numbers, which must be verified by owner-financed third-party testing"*

*It is not uncommon to see "60 IIC" or "65 IIC" required*

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## “SOUND ADVICE”

### Installer vs. Distributor

- Installer
  - Do they know building code requirements?
  - Do they know building construction?
  - Is this a price request or purchase request?
  - Is this an owner request or code mandate?
- Distributor
  - Who is making the request: architect, condo owner, association, installer?
  - Do they know building construction?
  - Is the request for a bid or purchase?
  - Is there another membrane currently specified?

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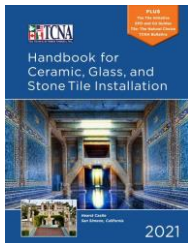
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## “SOUND ADVICE”

### Some undeniable truths...



*Installation issues can sabotage a good sound isolation product.*

*The Tile Council of America contains objective, relevant guidance on the subject of sound isolation.*

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## “SOUND ADVICE”

### “Flanking Noise”



*Sound isolation must be an “island”*

*The sound isolation membrane and finished surface cannot come in contact with: grout, thin-set, wall surfaces, cove base, or any penetrations. All perimeter joints must use an acoustic sealant or an approved acoustic foam/filler.*

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## "SOUND ADVICE"

### "Flanking Noise"



Sound isolation must be an "island"

Penetrations/nailing of hardwood floors through the sound iso sheet will result in transmission of vibration through nail fasteners, into the substrate below, resulting in failure

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## "SOUND ADVICE"

### "Flanking Noise"



Sound isolation must be an "island"

"Penetrations" through the floor could be floor-to-floor electrical, plumbing, or heating elements such as gas or electric fireplace installations...no grout, thin-set, tile, or cove base can make contact with any penetration.

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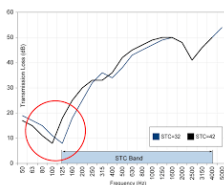
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## "SOUND ADVICE"

### Some avoidable pitfalls...



Asking a product to do more than its intended use...

"The devil is in the details..." which is especially true when you delve into sound isolation.

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## "SOUND ADVICE"

### ***Some avoidable pitfalls...***

- *Dig beneath the test bullet points*      *Asking a product to do more than its intended use...*
- *Third-party testing... ONLY*      *"The devil is in the details... which is especially true when you delve into sound isolation"*

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## "SOUND ADVICE"

### ***Is there a "best" sound isolation membrane?***

1. Sound Isolation... ✓
2. Crack Isolation... ✓
3. Waterproofing... ✓

*A sound isolation product that can offer multiple crack isolation and waterproofing benefits eliminates redundant application of additional membranes*

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## "SOUND ADVICE"

### ***"Best Practices"***



*Make sure you specify a "system" warranted adhesive if one is needed to bond the sound isolation sheet.*

*Use a "system" approved sheet membrane if waterproofing is needed, along with approved waterproof sealant/adhesives.*

*Acoustic sealants or acousti-foam are needed at perimeters.*

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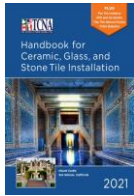
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## Why leave it to just anyone?

"Because tile is a permanent finish, the lowest bid should not be the driving factor, but rather who is the most qualified to perform the scope of the work specified."

- TCNA Handbook



The Tile Council of North America urges design professionals to include language in specifications to secure qualified contractors and installers. The following nonprofit programs are well-established and recognized by the Handbook Committee:

- Advanced Certifications for Tile Installers (ACT)
- Ceramic Tile Education Foundation (CTEF) Certified Tile Installer Program
- International Masonry Institute (IMI) Contractor College
- Journeyman Tile Layer Apprenticeship Programs
- Natural Stone Institute (NSI) Accreditation for Natural Stone Tile Installation
- National Tile Contractors Association (NTCA) Five Star Contractor Program
- Tile Contractors Association of America (TCAA) Trowel of Excellence Program



## MasterSpec®

### 1.5 QUALITY ASSURANCE

#### A. Installer Qualifications:

1. Installer is [a Five-Star member of the National Tile Contractors Association] [or] [a Trowel of Excellence member of the Tile Contractors' Association of America].
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs only [Ceramic Tile Education Foundation Certified Installers] [or] [installers recognized by the U.S. Department of Labor as Journeyman Tile Layers] for Project.
4. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of [mud floors] [mud walls] [membranes] [shower receptors] [gauged porcelain tile/gauged porcelain tile panels and slabs] [and] [large format tile].



## SpecLink

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**LARGE FORMAT TILE**

**MEMBRANES**

**MUD WORK**

**SHOWERS**

**GAUGED PORCELAIN TILE**

**GROUTS**



Advanced Certifications for Tile Installers  
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Ceramic Tile Education Foundation  
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National Tile Contractors Association / Five Star  
Contractor Group  
[tile-assn.com](http://tile-assn.com)  
[NTCAqualifiedlabor@tile-assn.com](mailto:NTCAqualifiedlabor@tile-assn.com)



Tile Contractors' Association of America  
[tcaainc.org](http://tcaainc.org)  
[info@tcaainc.org](mailto:info@tcaainc.org)



Tile Council of North America, Inc.  
[TCNAtile.com/find-qualified](http://TCNAtile.com/find-qualified)  
[info@tcnatile.com](mailto:info@tcnatile.com)

**ANY QUESTIONS?**



**This concludes our program.**  
**Please feel free to contact me for additional information.**

**Jim Medina, CSI**  
Director of Architectural Services – Noble Company

(702) 540-6025  
[james@noblecompany.com](mailto:james@noblecompany.com)

**THANK YOU!**

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