Sound Control Solutions

NAC

FRACTURE-FREE SINCE '83

Sound Control

Crack Isolation

Waterproofing

Moisture Barrier

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If it's not **SAM**...
it's not sound **CONTROL**

Δ22

Super SAM® 125

NAC
FRACTURE-FREE
SINCE '83

www.NACproducts.com
800-633-4622

ΔIIC: Delta Impact Insulation Class:

Delta IIC (ASTM E2179) refers to the accurate evaluation and comparison of the sound isolation characteristics of underlayment materials. Delta rations measure values that actually give a separate contribution value number of the product assembly by itself.

When it comes to sound control, *how* you choose to filter out the noise can make a big difference.

When a builder, architect, contractor, specifier or homeowner identifies a flooring situation in need of a sound control system, many factors should be considered prior to choosing a solution:

- Does the system provide adequate sound reduction?
- Is the system waterproof and moisture and mold resistant?
- Does the system provide crack isolation and the ability to immediately and successfully install hard surface flooring?

Many products available on the market today do not address all of these important issues. This booklet is an educational reference guide designed to provide information related to the value and importance of these systems as well as some solutions to help you make more informed decisions when investing in a sound control system.

What are the industry standards?

The industry standards are practices that define the installation of hard surface flooring as well as the test methods and physical properties for installation of the hard surface material. The industry standards have been determined or are recognized by industry professionals including, ANSI (American National Standards Institute), ASTM (American Society for Testing & Materials), TCNA (Tile Council of North America), NTCA (National Tile Contractors Association) among others, to serve as a guideline for the tile industry.

Knowing and understanding the industry standards can protect the building owner, home owner and specifier from problems due to failure. Some important specifications are outlined in the "technical data & specifications" section in the back of this reference guide. Full copies of these standards and practices can be obtained through NAC Products by calling 1-800-633-4622.

Who is responsible if the floor does not meet industry standards?

The contractor? The installer? The architect or specifier? The manufacturer?

Standards for sound control involve more than just choosing a product based on the level of sound reduction a product can achieve. It also includes the ability to protect the tile system from failure, such as cracked tile due to excessive loads, tile and thin-set delaminating from the sound control membrane and de-bonding of the membrane from the substrate.

All of these issues are addressed by ANSI test procedures and standards. See the "ANSI standard, A118.13, specifications for bonded sound reduction membranes for thin set tile installation in the back of this reference guide. A tile system that just accomplishes sound abatement but is inadequate for proper tile installations could result in a system failure and potential legal issues.

What is a sound rated floor system?

Typically used in high rise or multi family construction, a sound rated floor system utilizes sound control underlayment and/or a sound rated ceiling assembly to improve the acoustical performance of a floor system.

Issues to consider when reviewing sound control solutions

- Building code requirements.
  - Review to ensure conformance to International Building Code (IBC) and Local building codes.

- Legal and liability related issues
  - Protect yourself and your reputation; know your rights and responsibilities under the law.

- Homeowners association requirements
  - Some associations have requirements much higher than the building code, review to ensure compliance.

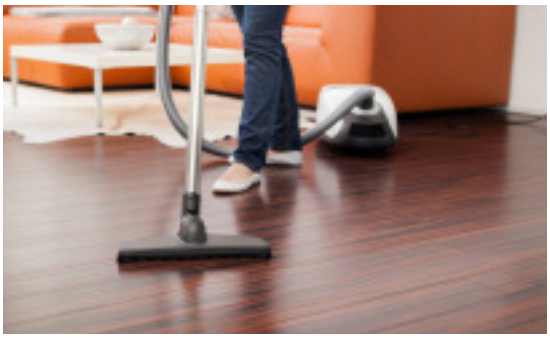
- Marketing issues
  - Developer/Buyer expectations and their flooring choices
  - Quality of life in multi-family environment
  - Resale value

How is Sound Measured?

There are three types of laboratory tests used to measure sound vibrations; Impact Insulation Class or IIC, Sound Transmission Class or STC and Delta IIC.

1. IIC: Impact Insulation Class

"The term IIC refers to the statistical measurement standards used to quantify the transmission of impact sound energy through a floor/ceiling assembly system. These types of sounds would be the equivalent to foot traffic, dropped articles, or furniture moving in the context of a multi-family building". *Tile Council of North America Handbook (2015)*



2. STC: Sound Transmission Class

"The term STC refers to the single figure of evaluation used to quantify the transmission of airborne sound through building elements, such as walls or floor systems. These types of sounds would be the equivalent of voices, radio, or television in the context of a multi-family building". *Tile Council of North America Handbook (2015)*

3. ΔIIC: Delta Impact Insulation Class

Delta IIC (ASTM E2179) refers to the accurate evaluation and comparison of the sound isolation characteristics of underlayment materials. Delta ratings measure the value of a product assembly by itself. For example, a bare 6" concrete slab without a (SRCA) has an IIC value between 26 and 30. By adding the delta rating of the product and the IIC rating of the concrete slab, one should arrive at the overall value of the composite assembly. In this scenario, Super SAM® having a Delta IIC of 22, could have an IIC value as high as a 52 when added to the IIC value of a bare concrete slab.

Refer to *Tile Council of North America Handbook (2015) for more information.*

Testing for Sound Control

Sound testing can be done in an approved laboratory or in a field setting at the location but there are significant differences between the tests.

Lab Testing: Lab tests are more reliable because they are conducted in a controlled atmosphere. This provides a more accurate model since a wide range of construction situations can be created while comparing the performance of the material being tested. The laboratory setting provides an excellent way to evaluate, compare and select flooring materials and systems.

Field Testing: Field tests are generally recognized to only be valid in the exact building where the testing took place. Testing should be required before AND after installation since there are many variables that can impact the outcome of the test and potentially lead to inaccurate or misleading results.

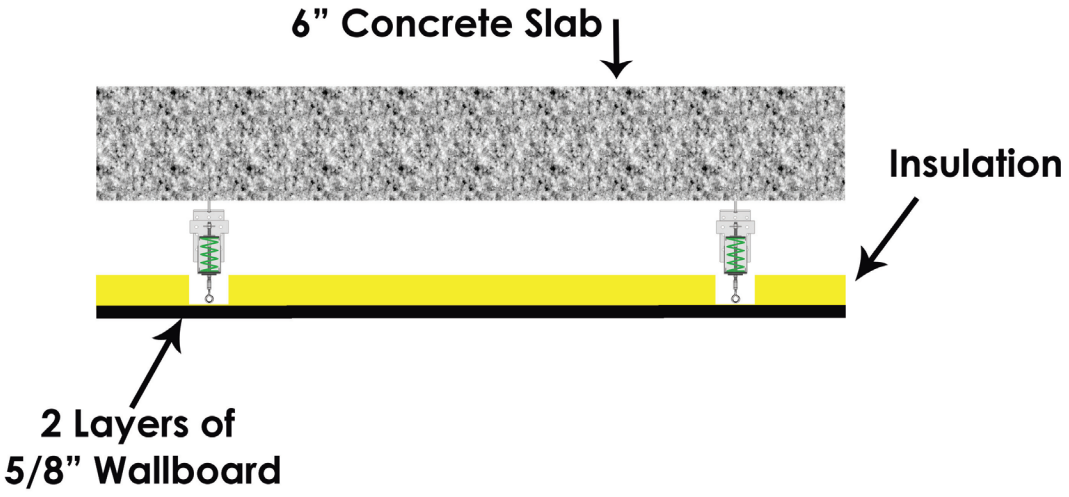
Flanking: There are a number of variables that can impact the results of sound control testing in the field. Flanking is the leaking of sound through other building systems that can affect sound attenuation from one living space to the next.

Some of these systems include electrical outlets and systems, plumbing penetrations and heating and cooling systems. Flanking can reduce field test readings by as much as five points. Other variables that can impact ratings include:

- Room sizes and furnishings in receiving room
- Street and other sources of exterior noise
- Elevators or other sources of noise in the building
- Construction details

Sound Rated Ceiling Assemblies (SRCA)

A **Sound Rated Ceiling Assembly** is an elaborate system typically used between the floor and ceiling in residential and commercial buildings, that uses a spring hanger with insulation in the cavity and 2 layers of 5/8" wallboard to achieve very high STC & IIC values.



TCNA Typical Sound Control Ratings for Concrete Slabs

Concrete Slab Thickness	No Sound Rated Ceiling Assembly	Sound Rated Ceiling Assembly*	In Lab IIC**	In Field IIC
6"	X		26 to 30	24 to 32
8"	X		28 to 32	25 to 35
6"		X	45 to 52	33 to 58

**Suspended Sound Rated ceiling composed of: 7" plenum, 3" of insulation, resistant channels, 5/8" Type X gypsum wallboard panels.*

***Tests were conducted in several different labs. Hence, the range of values for each slab thickness shows the variance between labs, not a variance in the test results within a single lab.*

IIC and STC Ratings and Building Codes

In most jurisdictions, there are minimum IIC and STC values that the floor/ceiling assembly must achieve in order to meet the building code standards. The most common are the Uniform Building Code (U.B.C.) and the International Building Code (I.B.C.) which call for a minimum of 50 IIC and 50 STC value. The higher the IIC or STC value the better sound attenuation.

While U.B.C. AND I.B.C. are the most common building code standards, some states, municipalities and counties may have different standards. Always consult your local building department for the exact code standards in your area. Additionally, some developers and homeowners associations have their own minimum standards which are often more stringent than the local code, so consult the developer and/or association before installation.

Beware of the Numbers Game

Be cautious of products claiming STC and IIC values in the high 60s or low 70s. These values are nearly impossible to achieve with hard surface flooring on a bare concrete slab without a very elaborate sound rated ceiling assembly (SRCA) or compromising the system as a whole.

Choose products designed for hard surface flooring

Some sound abatement products have too much deflection for the direct bonding of ceramic tile or natural stone tile. These products can range from recycled rubber products to synthetic foam underlayment and cork.

These products may have sound abatement properties but are often not suitable for supporting hard surface flooring. Since cork is harvested as a natural material, its quality and performance can be inconsistent. Cork without effective sound control capabilities can be as much as 1/2" thick and thus becomes problematic when remodeling a condominium. The installation of appliances, door thresholds and trim work can be compromised and expensive to correct.

Building Code Example: Florida Building Code

SECTION 1207 - SOUND TRANSMISSION

1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units or between dwelling units and adjacent public areas such as halls, corridors, stairs or service areas.

1207.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units from each other or from public or service areas shall have a sound transmission class (STC) of not less than 50 (45 if field tested) for air-borne noise when tested in accordance with ASTM E 90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilation or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to dwelling unit entrance doors; however, such doors shall be tight fitting to the frame and sill.

1207.2.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing 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.

Key Guidelines to Remember*

It is not good practice to select materials or systems based solely on field tests. Lab tests are a more accurate model for predicting performance in a range of different construction types; field tests are accurate only for the site where the tests were performed.

- If field tests are being conducted, require both before and after installation testing.
- Testing labs should be NVLAP (National Voluntary Laboratory Accreditation Program) certified and meet the criteria established in ASTM guidelines E548, E597, and in ASTM Standard E717.
- Sound abatement materials are often quite resilient, so a ****Robinson Floor Test (ASTM C627)** is strongly recommended.
- The thickness of the material used in the Robinson Floor Test should be the same as that shown for the sound control rating desired.
- If a suspended sound rated ceiling is not being used, then a relatively thick (full mortar bed) assembly on top of the slab may be required to achieve a 50 IIC.

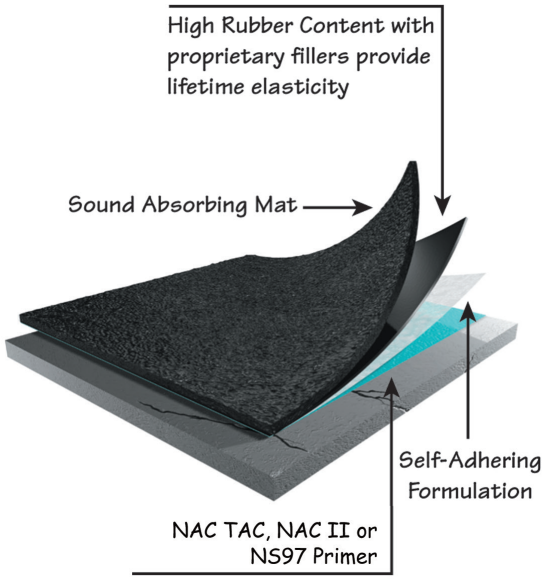
**According to 2015 TCNA Handbook (pg. 288)*

*****Robinson Floor Test:** This represents the live load resistance of rolling wheels on tile assemblies. The highest rating is "Extra Heavy Duty". The lowest is "Residential".*

NAC Sound Control Solutions
Meet and Exceed Sound Control Standards

Super SAM® 125
Sound Abatement Membrane
with crack isolation & waterproofing capabilites

Super SAM® 125 (Sound Abatement Membrane) is a 125 mil, self-adhering, sound reduction membrane designed for surfaces that require impact and audible sound reduction without a sound rated ceiling assembly. **Super SAM® 125** can also serve as a crack isolation membrane and a waterproof membrane, when used with an approved sealant. **Super SAM® 125** is most effective all-in-one membrane on the market.



How It Works:

Super SAM® 125 is composed of modified elastomers and sound deadening resins and is formulated to reduce airborne (STC) and impact (IIC) sound transmission.

When used under tile, stone, marble, wood and other hard surface flooring, an ANSI A118.4 modified thinset or solvent free adhesive must be used.

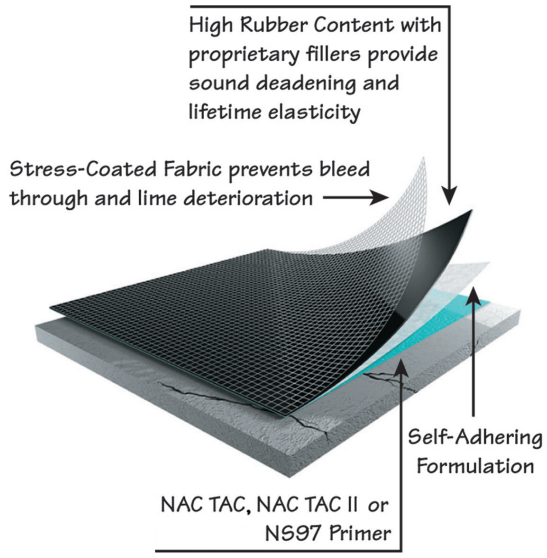
Super SAM® 125 must be installed with an NAC primer and forms a permanent bond to the substrate, producing a quick and economical installation over concrete, wood and other hard surface flooring without sound rated ceiling assemblies.

Features and Benefits

- Δ **22** on a bare 6" concrete slab w/tile
- **IIC = 51 STC = 54 ΔIIC = 22**
- Δ **23** on a bare 6" concrete w/wood
- **IIC = 51 STC = 52 ΔIIC = 23**
- **IIC = 56 STC = 61** over wood joist
- Up to 3/8" crack isolation protection
- Protects against delamination
- Eliminates need to cut tile to meet control/cold joints
- Resists moisture vapor transmission (MVT) 10#/1000SF/24HRS
- Safely covers asbestos flooring and provides an effective barrier against radon and mold
- No need to remove old floors or recess new ones
- Works with radiant-heated floors and tile-warming systems
- Tile can be installed the same day

SAM® 3
Sound Abatement Membrane
with crack isolation & waterproofing capabilites

SAM® 3 (Sound Abatement Membrane) is a 90 mil, self-adhering, sound reduction sheet membrane designed for surfaces that require impact and audible sound reduction ***with or without*** a sound rated ceiling assembly (SRCA). **SAM® 3** can be used over 6" or 8" concrete slabs, a wood substrate or over an existing floor that is structurally sound. **SAM® 3** can also serve as a crack isolation membrane and a waterproof membrane, when used with an approved sealant.



How it Works:

SAM® 3 membrane is composed of modified elastomers, sound deadening resins and reinforced woven fibers and is formulated to reduce airborne (STC) and impact (IIC) sound transmission.

When used under tile, stone, marble, wood and other hard surface flooring, an ANSI A118.4 modified thinset or solvent free adhesive must be used.

SAM® 3 must be installed with an NAC primer and forms a permanent bond to the substrate, producing a quick and economical installation over concrete, wood and other hard surface flooring **with or without** sound rated ceiling assemblies.

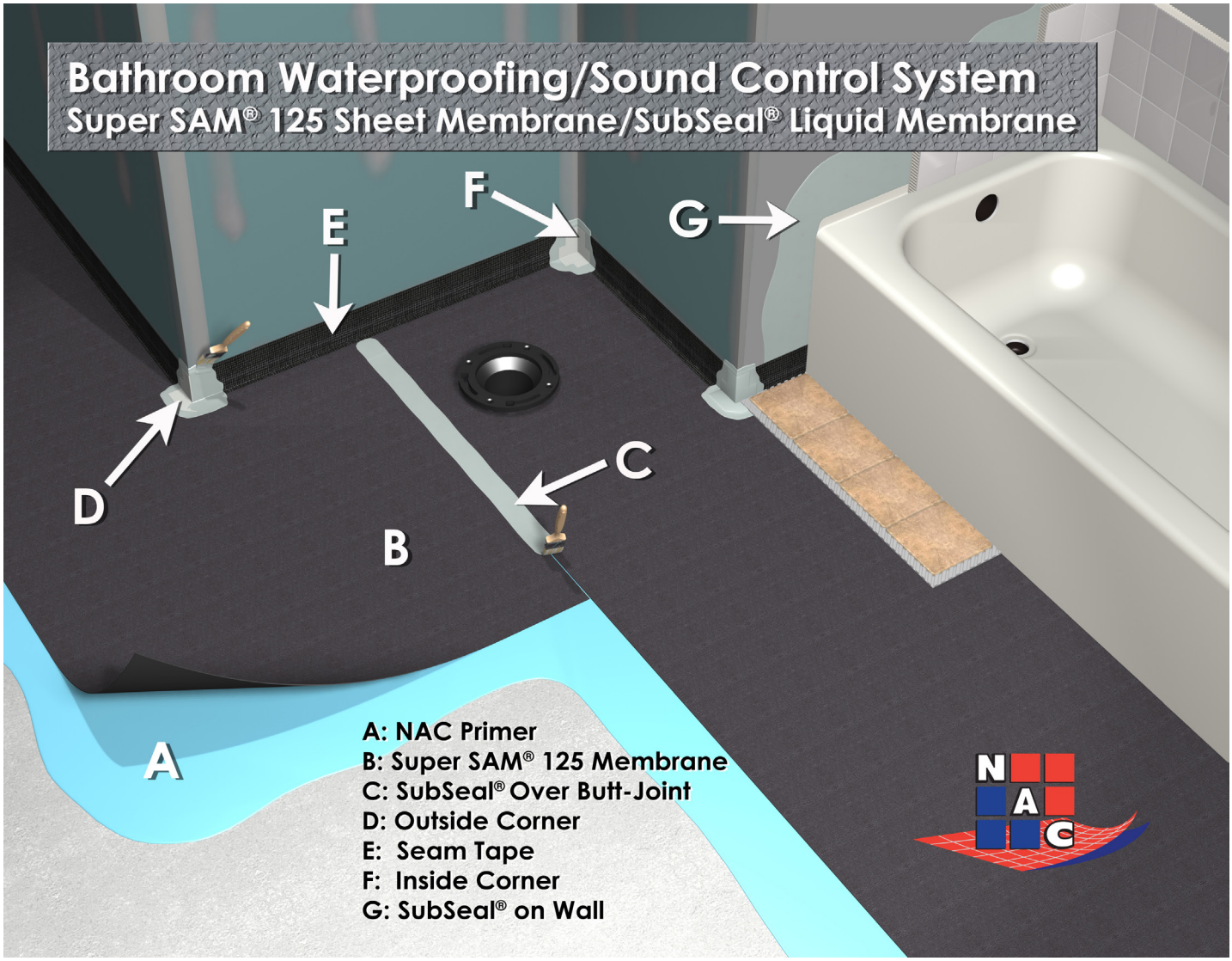
Features and Benefits

- ***IIC = 70 *STC = 67**
- Independent Lab Tested
- Up to 3/8" crack isolation protection
- Protects against reflective cracking
- Reduces live and dead load failures
- Use under a variety of hard surface flooring ceramic, porcelain, stone, marble etc.
- Use with or without a Sound Rated Ceiling Assembly
- Resists moisture vapor transmission (MVT) 10#/1000SF/24HRS
- Eliminates need to cut tile to meet control/cold joints
- No need to remove old floors or recess new ones
- Works with radiant-heated floors and tile-warming systems

Tested over a sound rated ceiling assembly

Waterproofing and Sound Abatement For Bathrooms

A sheet or liquid waterproofing membrane application in a bathroom is a sensable approach for surfaces requiring waterproof protection in the bathroom and surrounding areas. However, an emerging trend for bathroom installations includes the addition of a sound abatement membrane to reduce the transmission of impact and audible sound.



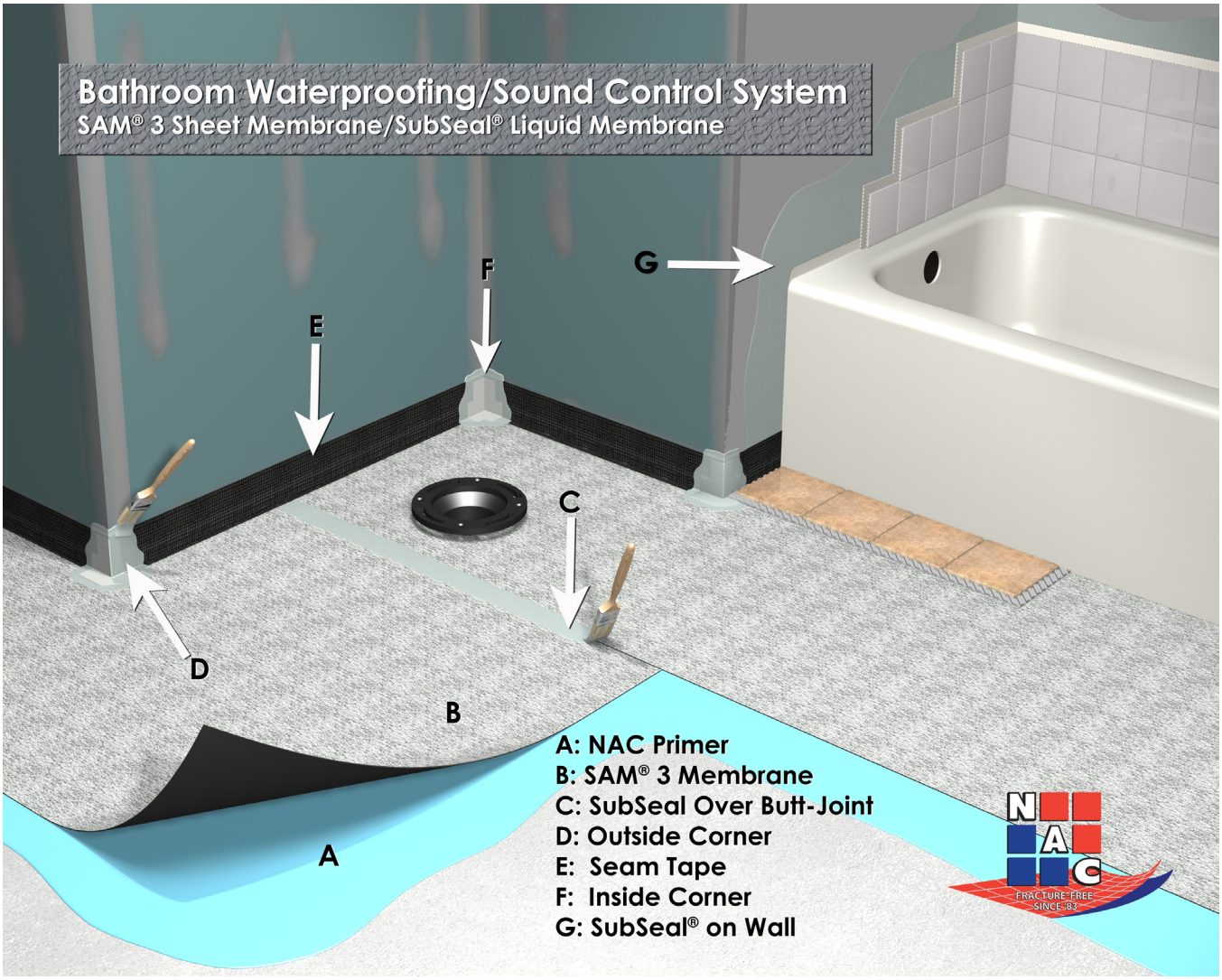
Premium Installation

Super SAM® 125 sound abatement membrane combined with SubSeal® liquid waterproof membrane, creates a double layer of protection for tile, stone and other hard surface installations. **Super SAM® 125** also function as a waterproof membrane when the joints and end seams are sealed with a urethane sealant or SubSeal® liquid. NAC sound abatement membranes will also provide crack isolation protection for up to 3/8" of lateral substrate movement.

Waterproofing and Sound Abatement For Bathrooms

Standard Installation

SAM® 3 sound abatement membrane combined with SubSeal® liquid waterproof membrane, creates a double layer of protection for tile, stone and other hard surface installations. **SAM® 3** also function as a waterproof membrane when the joints and end seams are sealed with a urethane sealant or SubSeal® liquid. NAC sound abatement membranes will also provide crack isolation protection for up to 3/8" of lateral substrate movement.



NAC Sound Control Systems

NAC offers a variety of sound control solutions that are the ideal application for apartments, condominiums, multi-level hotels, residence halls, high-rise office buildings, media rooms, children's play areas, classrooms and any other areas that require impact and audible sound reduction.

A118.13 American National Standard Specifications for Bonded Sound Reduction Membranes for Thin-Set Ceramic Tile Installation

Introduction

This introduction is not a part of American National Standard Specifications for Bonded Sound Reduction Membranes for Thin-Set Tile Installation, A118.13.

Bonded Sound Reduction membranes for thin-set ceramic tile installation lower the transmission of sound from one room to the room below. Membranes covered by this specification are bonded to a variety of manufacturer-approved substrates covered by ANSI specifications. Products within the scope of this specification are applied below ceramic tiles by traditional methods and materials. Dimension stone is a product of nature with a wide variety of inherent characteristics including veins, fissures, starts, and dry-seams. These characteristics may make the stone tile relatively fragile and susceptible to cracking and chipping when exposed to traffic. This susceptibility can be even more predominating when stone is placed on sound reduction materials, which are almost always resilient or compressible by nature. This standard was specifically created for ceramic tile. If used for dimension stone for tests in section 5.1, 5.2, and 5.3, the type of stone, facial dimensions, and thickness should be identified and replicated to a specific field application.

This standard applies to trowel applied, liquid, and flexible sheet membranes.

These membranes provide the lowest profile (elevation) of the tile installation incorporating a bonded sound reduction membrane.

Consult individual manufacturers for specific instructions, application, performance levels, and limitations concerning their materials. Follow the individual manufacturer's written instructions precisely.

This standard was developed to provide specifiers and installers with the minimum criteria necessary for a material to function as a bonded sound reduction membrane when used with ceramic tile. Additional tests, which are not a requirement of this specification, may be run when requested for a particular project, using the exact materials for that project.

Additional general information is also available in the current TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.

End of Introduction

1.0 Scope

This specification describes the test methods and minimum requirements for sound reduction membranes for thin-set ceramic tile installation. It should be noted that while sound reduction membranes are intended to minimize the transfer of sound from one room to the room below, it is only a part of the overall system.

Substrates, flooring material, ceiling assemblies, etc., will all affect the overall values. It is important when dealing with a sound reduction membrane that the perimeter joints are properly located and filled as per the manufacturer's instructions. The individual manufacturers, project engineers, and architects should be consulted, per Tile Council of North America (TCNA), regarding their requirements for expansion and control joint material and placement.

2.0 Definitions

2.1 Latex Portland cement mortar
A modified dry-set Portland cement mortar for the bonding of ceramic tile into which a polymer has been incorporated either in latex form or as a redispersible powder. When added in latex form it is added as a replacement for part or all of the gauging water. The setting bed, after the tile is embedded, shall be nominally between 3/32" and 1/4" in thickness. The setting bed is the thickness of the thin bed mortar between the substrate and the plane of the back of the tile module. Modified dry-set mortars are designed as direct bond adhesives and are not intended to be used in truing or leveling underlying substrates or the work of others.

2.2 Acoustical joint
A joint with the primary function of to achieving and maintaining the specific sound value of the system with a non-drying, non-hardening, rubber like seal. Acoustical joints are required at the perimeter of the floor area being treated, and all penetrations and retaining surfaces. Sealants are to be acoustically rated and installed per ASTM C919-08.

2.3 Movement joints

2.3.1 Construction joint: The surface where two successive placements of concrete meet, across which it may be desirable to achieve bond, and through which reinforcement may be continuous.

2.3.2 Contraction joint: Formed, sawed or tooled groove in a concrete structure to create a weakened plane and regulate the location of cracking resulting from the dimensional change of different parts of the structure.

2.3.3 Control joint: See contraction joint.

2.3.4 Expansion joint: (1) A separation provided between adjoining parts of a structure to allow movement where expansion is likely to exceed contraction; (2) a separation between pavement slabs on grade, filled with a compressible filler material; (3) an isolation joint intended to allow independent movement between adjoining parts.

2.3.5 Isolation joint: A separation between adjoining parts of a concrete structure, usually a vertical plane, at a designated location such as to interfere least with performance of the structure, yet such as to allow relative movement in three directions and avoid formation of cracks elsewhere in the concrete and through which all or part of the bonded reinforcement is interrupted.

2.4 Ceramic tile

Ceramic tile referred to in this standard is as defined in ANSI A137.1. The tile for tests in this standard are to be dry and clean as obtained from manufacturers undamaged cartons. Water absorption of tile is determined by ASTM C373. Tile for tests in this standard include the following:

Designation	Description
Type A	*Glazed wall tile, 4 1/4" x 4 1/4" (108 mm x 108 mm), having a nominal thickness of 5/16" (8 mm), water absorption of 13%-15%.
Type X	4" x 4" x 5/16" (102 mm x 102 mm x 8 mm) nominal unglazed paver tile with a water absorption of 0%-0.5%. The smooth face is used as the bonding surface. (May be saw cut to size from a larger tile.)
Type X-3	12" x 12" x 5/16" (304 mm x 304 mm x 8 mm) nominal unglazed porcelain tile with water absorption not exceeding 0.5%.

*In order to obtain comparable results, the tile selected shall be Standard Grade, of one glaze color, obtained from one manufacturer. Bonding surface must be cleaned of dust produced by cutting. Brush wet and flush with plain water.

3.0 Sampling and testing procedures

3.1 Sample

Obtain a sufficient quantity of membrane, setting materials and admixtures for a minimum 100 sq. ft. installation based on the manufacturer's recommended coverage. All materials shall be in the manufacturer's sealed packaging and from commercial lots of recent manufacture.

3.1.1 Sample preparation: Prepare trowel applied, liquid, or sheet membrane samples according to the manufacturer's recommended application procedures. For some tests, an unbonded sample of membrane is required. In these tests, liquid or trowel applied materials shall be applied to a non-bondable material (such as polyethylene film or Teflon), cured according to the manufacturer's instructions, peeled, and cut if necessary to obtain a suitable sample. All other system components shall be mixed and applied as directed by their manufacturer's written instructions.

3.2 Temperature

Unless otherwise stated in a particular test, curing, conditioning and all tests are to be run at standard conditions of 70°F-77°F (21°C-25°C) and a relative humidity of 45%-55%.

Components (latex, mortar, tile, etc.) used in performing all tests shall be stored in the original sealed packaging at the standard conditions specified for each test for a minimum of 12 hours prior to use. Material temperatures shall be verified before proceeding.

3.3 Recording test values
In any of the following tests, which require more than one sample or specimen, record each individual test value and determine the mean of the multiple values for comparison with the test requirement. Values which do not reflect a normal distribution of shear strengths shall be discarded when they satisfy the Dixon test for extreme values as follows:

$$\text{If } X2 - X1 \geq 0.765 \text{ then the lowest value shall be discarded}$$
$$X4 - X1$$

$$\text{If } X4 - X3 \geq 0.765 \text{ then the highest value shall be discarded}$$
$$X4 - X1$$

where X1, X2, X3, X4, are the observed shear strength values from lowest to highest.

4.0 Tests for material properties

4.1 Fungus and microorganism resistance (required for products intended for use in wet areas)
Test for mold growth: The organism used for this test shall be Aspergillus Niger. The stock cultures shall be stored in a refrigerator at 37.4°F-50°F (3°C-10°C) prior to use. Stock cultures stored for more than four months shall not be used. The culture medium shall be potato dextrose agar from Difco Products, Inc. Detroit, Michigan – or its equivalent. Dissolve 39 grams of the agar in one liter of water, using heat. Autoclave the medium and two 1" (25mm) square pieces of Type A tile at 15 psi (1.1 kg/cm2) for 15 minutes. Apply a section of membrane to the tile following the manufacturer's recommended installation procedures at the minimum required thickness. Place the coated tile with the membrane side up in a sterile Petri dish and pour sterile agar into the dish until the surface of the agar is level with the edge of the membrane. Inoculate with the organism.

4.1.1 For control purposes, one petri dish containing only the agar medium and the other piece of tile shall be inoculated with the test organism to determine the viability of the inoculum.

4.1.2 Place the petri dishes in an incubator at 82.4°F-86°F (28°C-30°C) and a relative humidity of 85%-95%. After 14 days of incubation, examine to ascertain whether the membrane supports mold growth. (At the end of the inoculation period, the control shall demonstrate visible evidence of mold growth.) Requirement: The membrane shall not support mold growth.

5.0 Tests for system performance

5.1 Shear strength to ceramic tile and cement mortar

5.1.1 Preparation of mortar blocks: Prepare 12 mortar blocks as specified in ASTM C482 Section 9.1.2. Blocks shall be stored for 25 additional days at the conditions specified in Section 3.2 above prior to use

5.1.2 Preparation of shear bond assemblies: Follow the manufacturer's instructions and apply the membrane to the entire face of the mortar blocks described in 5.1.1. Allow the membrane and or adhesive to cure for 24 hours. Apply a Type X tile to the membrane, offset 1/4", using the manufacturer's recommended adhesive system and application rate, including bonding material thickness after beat in of the tile. Cylindrical metal spacers approximately 1" long, or 1/8" (3mm) T-bar spacers, or other suitable spacers, shall be placed between the tile and membrane to insure a proper and uniform thickness of the bonding material. The spacers shall be removed after scraping the excess bonding material from the edges of the tile and membrane. Allow the bonded assemblies to cure for seven days at 70°F-77°F and 45%-55% relative humidity. Measure the bonded area to the nearest 1/2 sq. inch.

5.1.3 Seven day shear strength: Shear four assemblies to failure immediately after the seven day cure in 5.1.2 using the method described in ASTM C482 Section 9.8. Record the stress at failure.
Requirement: Average shear strength greater than 50 psi.

5.1.4 Seven day water immersion shear strength (required for products intended for use in wet areas): Immediately after the seven day cure outlined in 5.1.2, immerse four samples prepared in 5.1.1 in water for seven days. Shear the assemblies to failure within 10 minutes of removal from water, recording stress at failure.
Requirement: Average shear strength greater than 50 psi.

5.1.5 Four week shear strength: Cure four specimens prepared in 5.1.2 for an additional three weeks at the specified conditions and shear to failure. Record the stress at failure.
Requirement: Average shear strength greater than 50 psi.

5.2 Robinson floor test

The methods outlined in ASTM C627 shall be followed, and the test assembly shall consist of a concrete test substrate, sound reduction membrane installed per manufacturer's instructions, TCNA 118.4 High Performance Thin-Set Mortar[1] (or equivalent), ANSI A118.6 compliant grout with 1/4" joints, and Type X-3 tiles. If any alternative assembly (including but not limited to a different tile type, tile size, adhesive type, grout type, joint size, and/or subfloor assembly) is tested, ALL COMPONENTS USED IN THE TEST MUST BE DISCLOSED.

Requirement[2]: At minimum, the test assembly shall complete cycles one through three without evidence of failure and achieve a "Residential" rating according to the TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.

5.3 Sound transmission reduction test

5.3.1 Test room: Two vertically adjacent rooms shall be constructed as described in ASTM E 492.

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[1]TCNA 118.4 high performance thin-set mortar is a standardized ANSI A118.4 compliant latex modified thin-set mortar that has been identified by the Tile Council of North America Grout and Mortar Subcommittee as being capable of achieving a 28 day impervious mosaic tile shear bond strength greater than 450 psi.

[2]Although this specification requires a minimum service rating of "Residential", individual projects may require a higher service rating based on the expected traffic. Refer to the Floor Tiling Installation Guide in the TCNA Handbook for Ceramic, Glass, and Stone Tile Installation for more information on service requirements.

5.3.2 Test substrate: A standard concrete floor shall be constructed between the two rooms as described in section 7 of ASTM E 2179. The surface shall be prepared as required by the membrane manufacturer's instructions.

5.3.3 Membrane: Apply the membrane to the concrete floor substrate according to the manufacturer's instructions. Cure bonding adhesive and membrane according to membrane manufacturer's instructions.

5.3.4 Tile: Use a tile adhesive recommended by the membrane manufacturer to bond a sufficient quantity of Type X-3 tiles, such that the entire test floor is covered. Follow the tile adhesive manufacturer's instructions for mixing, application, and cure time prior to grouting.

5.3.5 Grout: Grout joint width shall be 1/4". Use a grout recommended by the membrane manufacturer. Follow grout manufacturer's instructions for mixing, application, and clean up.

5.3.6 Curing: Allow a minimum of 28 days curing from the time the tile was set on the membrane, at standard conditions described in 3.2 above.

5.3.7 Test apparatus: A standard tapping machine meeting the requirements of ASTM E 492 shall be installed atop the finished floor of the upper level room. The frequency response of the electrical system in the room below, including the filter or filters in the source or microphone systems, shall satisfy the specifications given in ANSI Specification S1.11 for a 1/3 octave band filter set, order three or higher, Type 1.

5.3.8 Testing: Testing shall be performed according to section 4 of ASTM E 2179. Differences in normalized impact sound pressure levels between the finished floor and the bare standard concrete floor shall be subtracted from the levels defined for a reference concrete floor, and an Impact Insulation Class (IIC) rating shall be calculated as per ASTM E 2179, sections 13.1 through 13.3. The improvement in impact insulation class due to the floor covering, ΔIIC, shall be calculated as per section 13.4 of ASTM E 2179.
Requirement[3]: The floor assembly shall obtain a ΔIIC rating of 10 or greater.

End of ANSI A118.13

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[3]Although this specification requires a minimum laboratory ΔIIC rating of 10, it is possible that your construction detail could require a higher level of ΔIIC sound attenuation than the 10 ΔIIC minimum in this standard to produce a code compliant installation. Consult with an architect, acoustical engineer or a building code official to ensure that the system you plan to install complies with local code requirements. Also, it is possible for field installed systems utilizing the same sound reduction membrane as tested in this specification to yield either more or less effective sound reduction values. Field installation variables such as slab thickness; slab density and porosity; ceiling heights and assemblies; floor penetrations; tile type and size; adhesive type; grout type and joint width; room size; atmospheric pressure; framing member type and arrangement; fastener locations; and other factors can have profound effect on field impact (FIIC) sound transmission measurements.

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IIC: 51 STC:54 ΔIIC: 22

6" concrete substrate with engineered hardwood finished floor:
IIC: 51 STC: 52 ΔIIC: 23

Wood joist substrate with tile finished floor:
IIC: 56 STC: 61

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