NATIONAL APPLIED CONSTRUCTION PRODUCTS

# Waterproofing Solutions

Waterproofing

# When it comes to waterproofing, are you getting a complete solution or a temporary fix?

Water can create havoc throughout the building envelope. Not addressing water issues promptly can do more than just damage the building structure. It can be unsettling to families and businesses, promote mold growth, and can harm the integrity of a structure lowering its value, not to mention the costs and disruption associated with repairs.

Some of the common areas where water problems occur include kitchens, bathrooms, exterior decks, shower pans, steam rooms, saunas and more.

When a builder, architect, contractor, specifier or homeowner identifies a flooring situation in need of a waterproofing solution, additional factors should be considered; does the solution provide moisture vapor protection and mold resistance in addition to waterproofing? Does the solution work in extreme temperature conditions? Does the solution provide crack isolation from expansion and contraction of the substrate and the ability to immediately and successfully install flooring? Is the solution backed by a company with a history of success?

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 waterproofing system.

# What are the industry standards?

The industry standards are practices that define the installation of ceramic tile and other hard and soft surface flooring, as well as the test methods and physical properties for the installation materials.  The industry standards have been developed and are recognized by industry professionals including, ANSI (American National Standards Institute), ASTM (American Society for Testing & Materials), TCNA (Tile Council of North America), MMSA (Materials and Methods Standards Association, 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 other decision makers from expensive repairs and potential litigation due to improper planning, specification and/of or installation waterproofing products and systems. Some important specifications are outlined in the “technical data & specifications” section in the back of this reference guide. Consult the current edition of the TCNA Handbook for the latest updates on industry methods and specifications.

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

The manufacturer? The contractor? The installer? The architect? The specifier? Solutions for waterproofing involve more than just being a barrier for water migration. It must also withstand temperature variations and prevent mold and moisture vapor transmission. It should also include the ability to protect the tile system from failure, such as cracked tile due to excessive loads, tile and thin-set delaminating from the waterproofing membrane and de-bonding of the membrane from the substrate. All of these issues are addressed by ANSI test procedures and standards. A flooring solution that fails to provide a watertight seal could weaken the entire system and result in potential legal and liability issues.

# Additional considerations when reviewing product performance:

- **Threshold Requirements:**

  Specifications often do not match the actual sight conditions for new construction and existing renovations.  NAC solutions are the thinnest, most durable layers of protection in the marketplace.

- **Soft Joint Spacing:**

  Soft joints are a critical part of a tile system that account for movement in the tile field. The TCNA guidelines for movement joints under EJ171 clearly states how the location and frequency of joints should be placed based on the conditions of the installation.

- **Hard to Reach and Problem Areas:**

  Corners, flashing and areas where the building envelope meets the waterproofing should be clearly defined.  NAC has products and systems specifically designed to strengthen the bond and watertight seal in these problem areas.

- **Warranty:**

  Consider the type and length of the warranty. Ensure the company providing the warranty has a history of success in the industry. Contact NAC for complete warranty details or visit **https://nacproducts.com/pages/resources**

# Guidelines and Installations for Wet Areas

When choosing an installation method, consideration must be given for the amount of water the area will be subjected to. Wet area installation methods typically incorporate waterproofing to contain and evacuate water and to protect building materials. Damage can result from water exposure that exceeds the method's Environmental Exposure Classifications rating. Maintenance practices for the area must also be considered.

There are two general categories of waterproof installation methods:

- Use of an unbonded water-containment membrane (i.e. unbonded shower pan membrane)
  - — Loose laid liner placed below the mortar bed receiving the tile
  - — Connect into drains at the clamping ring
- Use of a bonded waterproof membrane that meets ANSI A118.10
  - — Sheet membranes and roll-on or trowel-on liquid materials that dry/cure to form a waterproof membrane
  - — Connect to drains at clamping ring or just below the tile when an integrated bonding flange is used

## Slope to Drain

Shower pans and bonded waterproof membranes must slope to and connect with a drain to fully evacuate water. Plumbing code typically requires membranes to be sloped a minimum of ¼" per foot and extend at least 3" above the height of the curb or threshold.  Membranes must be installed over other horizontal surfaces in wet areas subject to deterioration, like shower seats.  They must be sloped and configured so as to direct water to the membrane connected to the drain.

## Weep Holes

The weep holes of clamping drains enable water to pass from the membrane into the plumbing system. Crushed stone or tile or other positive weep protectors placed around/over weep holes prevent their blockage.

## Connection with Drain or Flange

To form a watertight seal, membranes must have adequate contact with the clamping ring of the drain or with the bonding area of an integrated bonding flange.

## Membrane Cuts and Penetrations

Membranes must be protected to prevent punctures resulting from traffic on the membrane before the mortar bed is installed for (shower pan membranes) or before the tile is installed (for bonded waterproof membranes). For punctures that do occur, the membrane must be replaced or repaired according to the membrane manufacturer's directions for repairs. Ensure the integrity of any repairs by water testing the repaired membrane.

## In-Corners, Out-Corners, and Seams

Shower pan membrane in-corners should be folded not cut.  Preformed out-corners better enable wrapping of the membrane at the curb/jamb interface. For sheet-type bonded waterproof membranes applied topically, preformed in-corners and out-corners enable waterproofing of corners without excessive material thickness that would result from folding. Sheet membranes in large areas are seamed, bonded, or otherwise welded together to form a continuous membrane.

## Liquid Applied and Trowel-Applied Bonded Waterproof Membranes

These products require a minimum wet film thickness and have specified cure/dry time requirements. Some membranes of this variety incorporate a mesh that is embedded in the wet material during installation. Mesh may be required over the entire surface to be waterproofed or only in corners and/or joints.

## Configuration of Shower Receptor Components

When a shower pan membrane system is employed, some backer board types must be installed with the board held out of the mortar bed due to the saturation that occurs below this level. Vapor retarder membranes fastened to studs must weather-lap the shower pan membrane or flange of the tub or prefabricated shower receptor.

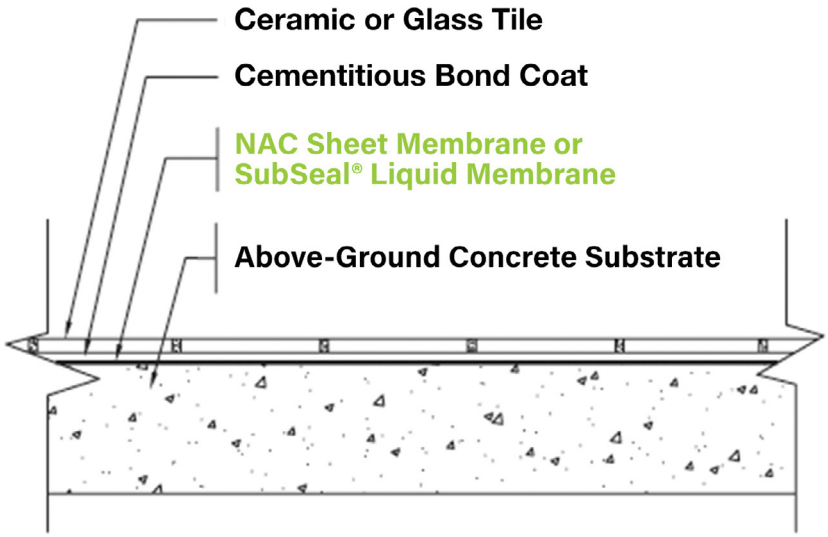
Regardless of which membrane system is used, the membrane must completely wrap the curb, and the jamb must be waterproofed to its outside edge a minimum of 3" above the curb. Curb and jamb waterproofing must be seamed together without breach to form a continuous barrier.

## Performing a Water Test

Where complete waterproofing is required such as in showers, water testing of the membrane, by the installing contractor, is recommended and may be required by applicable plumbing code.

# CONCRETE WATERPROOFING

## NAC Sheet Membrane or SubSeal®




**All NAC sheet membranes (ECB®, ECB® 75, Strataflex®, SAM® 3 and Super SAM® 125) and SubSeal Liquid membrane may be used for surfaces that require waterproof protection.**

**A urethane sealant must be used at butt-joints and termination points for sheet membranes.**

**For specification purposes, the NAC products used in this system are:**

- **SubSeal Liquid Membrane**
- **NAC Sheet Membranes**
- **NAC Primer (If sheet membrane is used)**
- **NAC Approved Urethane Sealant**

**Detail refers to F122A for waterproofing over concrete. See current edition of the TCNA Handbook for additional guidelines.**

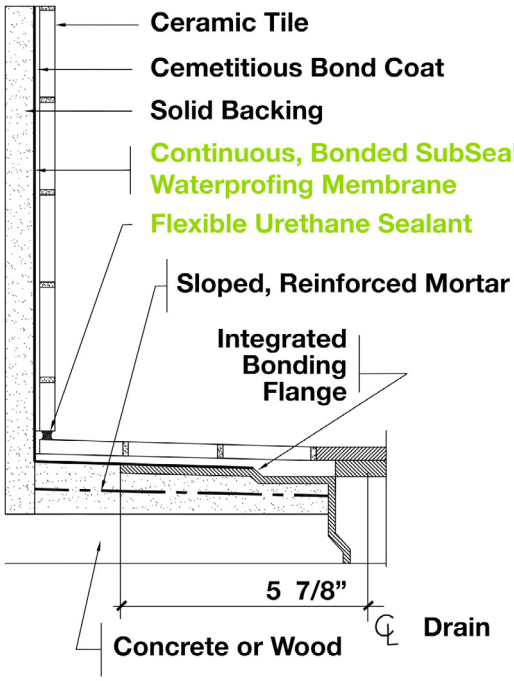
**Visit NACproducts.com or call 800-633-4622 for more information.**

**www.nacproducts.com | 3200 South Main Street, Akron, OH 44319**

See product PDS, Install and SDS sheets for complete instructions and safety requirements

# SHOWER WATERPROOFING

## SUBSEAL® LIQUID MEMBRANE




**Shower receptors, curbs,seats,etc., must be properly waterproofed and installed to avoid water damage to adjacent building materials.**

For specification purposes, the NAC products used in this system are:

- SubSeal Liquid Membrane
- Strataflex Sheet Membrane (If Required)
- NAC Primer
- NAC Approved Urethane Sealant

Detail refers to B422 for shower receptors. See current edition of the TCNA Handbook for additional guidelines.

Visit NACproducts.com or call 800-633-4622 for more information.

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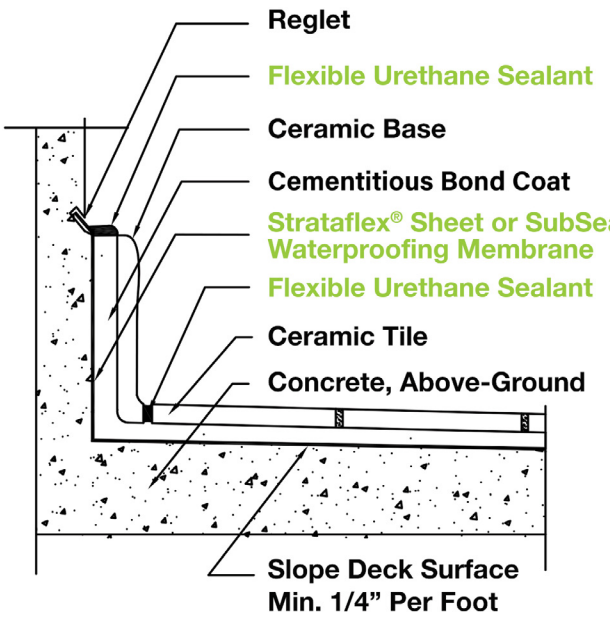
# DECK WATERPROOFING

## STRATAFLEX® SHEET OR SUBSEAL® LIQUID




**Either Strataflex sheet or SubSeal liquid membrane may be used in this application.**

**For specification purposes, the NAC products used in this system are:**

- **SubSeal Liquid Membrane**
- **Strataflex Sheet Membrane**
- **NAC Primer (If sheet membrane is used)**
- **NAC Approved Urethane Sealant**

**Detail refers to F104 for roof deck or balcony. See current edition of the TCNA Handbook for additional guidelines.**

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**www.nacproducts.com | 3200 South Main Street, Akron, OH 44319**

See product PDS, Install and SDS sheets for complete instructions and safety requirements

# NAC Products Waterproofing Solutions


## Strataflex® Waterproofing Membrane

Strataflex peel-and-stick sheet membrane is a high strength, 40 mil (1/16”), self-adhering, elastomeric membrane designed for use under interior and exterior floor surfaces that require waterproofing protection. Strataflex is applied with an NAC primer, and features a 2” double-stick lap joint that creates a watertight seal, providing exceptional waterproof protection.

### How It Works

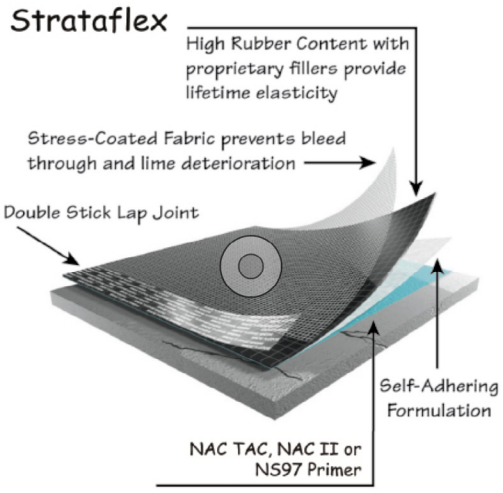
Strataflex is composed of a tough non-asbestos fiber sheet, laminated to a polymer modified bitumen. A unique “Stress Flex” fabric allows for thin-bed or thick-bed application of a variety of hard surface flooring*.

Adhered permanently to the substrate with an NAC primer, Strataflex forms a continuous, impervious water barrier, staying flexible under structural stress, and withstanding extreme climates. Strataflex also provides crack isolation protection for up to 3/8” lateral expansion and contraction.

### Contains Zero VOCs

Certified Clean Air GOLD, Strataflex contains no VOCs and conforms to the California Department of Public Health (CDPH) Standard Method v1.2 for private office, school classroom and single family residence. Strataflex is the perfect solution for condominiums, bathrooms. kitchens, restaurants, malls, office buildings and any commercial or residential installations requiring waterproof protection.

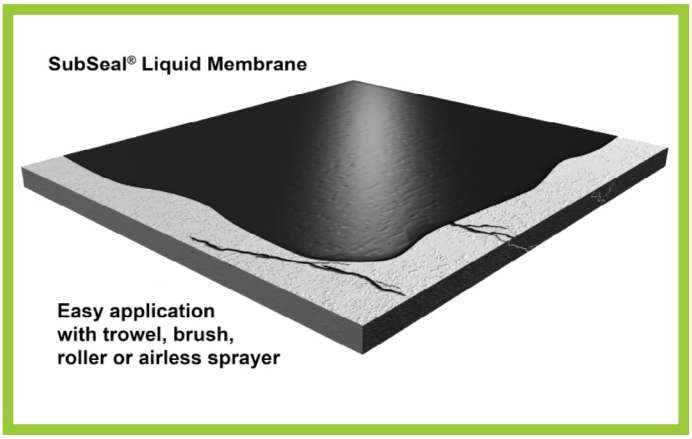
***(*Softer flooring like vinyl, VCT, SPC and others may require alternate installation. Contact NAC for instructions.)***




- Suitable for interior and exterior use
- Crack protection for up to 3/8” of lateral movement
- 2” lap joint creates a watertight seal
- Meets ANSI A118.10 and A118.12
- Same day flooring installation
- Clean Air GOLD certified, No VOCs
- Serves as barrier to MVT
- Works with radiant-heated floors and tile warming systems

# SubSeal®
# Liquid Waterproofing Membrane

SubSeal is a one-part, ready-to-use elastomeric waterproofing membrane designed for interior and exterior substrates that require waterproof protection. It also functions as a sealant, stand-alone crack suppressant and moisture barrier for hard surface, resilient and wood flooring. SubSeal bonds to a variety of substrates, metal drains, PVC, ABS fixtures, stainless steel, concrete backer board and more.


- Suitable for interior and exterior use
- Use as a stand alone waterproofing membrane
- Crack protection for up to 1/8” of lateral movement
- Thin, low profile with superior flexibility
- Protects against reflective cracking and delamination
- Assures waterproof integrity of corners and seams
- Eases application in hard to reach areas
- Quick drying allows same day tile installation
- Flood test in less than 24 hours
- Effective barrier against mold
- Clean Air GOLD certified, No VOCs

## How It Works

Easily applied with a trowel, brush, roller or air less sprayer, SubSeal bonds to the substrate with superior adhesion and meets ANSI A118.10 for thin-bed, load bearing waterproofing membranes. SubSeal cures to form a thin, flexible layer that is an impervious water barrier. It can can be used at floor-to-wall and wall-to-wall joints, at drains and protrusions and at all perimeters. Works with A118.4 latex mortars, organic adhesives and solvent-free epoxy setting materials. SubSeal also protects surfaces from structural movement for up to 1/8” of lateral substrate movement.

## Contains Zero VOCs:

Certified Clean Air GOLD, SubSeal contains no VOCs and conforms to the California Department of Public Health (CDPH) Standard Method v1.2 for private office, school classroom and single family residence. Strataflex is the perfect solution for condominiums, bathrooms. kitchens, restaurants, malls, office buildings and any commercial or residential installations requiring waterproof protection.


# Extreme Waterpoofing Systems

## Exterior Decks

### What is it?

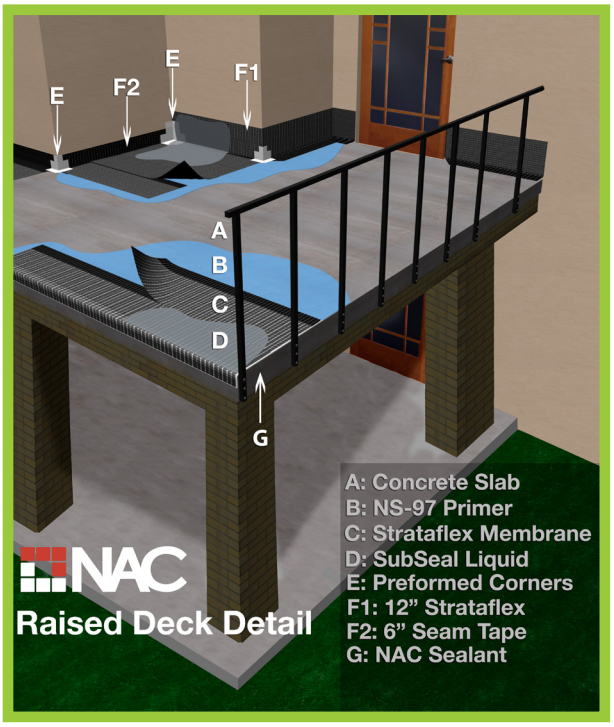
The Extreme Waterproofing System combines Strataflex sheet and SubSeal liquid waterproofing membranes to provide a double layer of waterproof protection for exterior decks, especially in areas with extreme heat and cold conditions.

This system utilizes pre-formed inside/outside corners, 6” seam tape, and polyurethane sealant to provide a complete watertight seal in tough waterproofing applications, such as exterior decks over a living space, assuring long lasting protection of your deck and the space beneath it.

### How It Works

Using NAC TAC or NS97 primer, 6” Seam tape is applied at the floor to wall joint, three inches on the substrate and three inches up the wall. The primer is then applied to the substrate and the Strataflex membrane is installed according to the membrane installation instructions. SubSeal is then applied over the Strataflex, according to the SubSeal installation instructions. Pre-formed inside and outside fabric corners are placed in the appropriate corners and secured with Subseal. A one-part polyurethane sealant is then applied at all terminations and end seams of the membrane and seam tape.

The thin, low-profile Extreme Waterproofing System is a perfect solution for wood or concrete exterior balconies and decks, especially over a living space.




***NAC Extreme Waterproofing System requires following the TCNA guidelines for waterproofing and control joint placement (EJ171).***

- Double layer of waterproof protection
- Ideal for decks over a living space
- Crack isolation protection
- Thin, low-profile system is a perfect solution for low threshold applications
- Same day tile installation
- Most complete system on the market
- 5-year material warranty
- Exceeds ANSI A118.10 for waterproofing and A118.12 for crack isolation

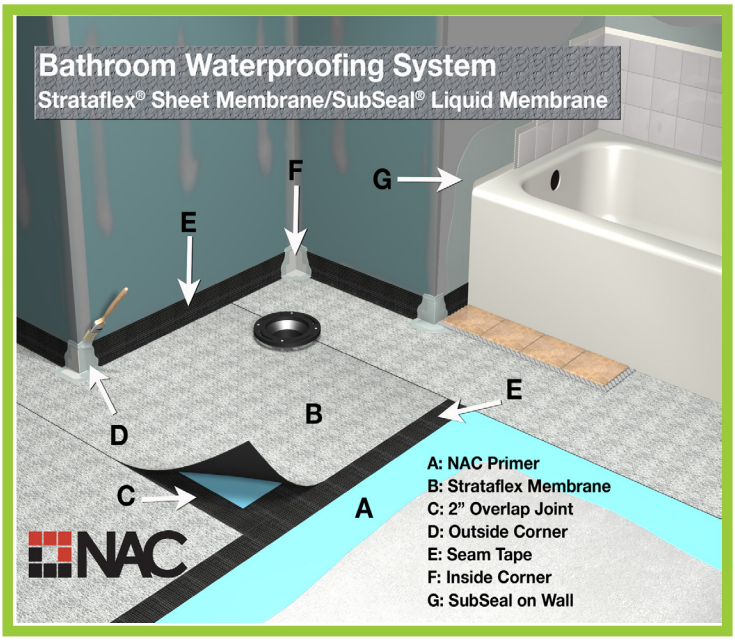
# Extreme Waterpoofing Systems

## Bathroom Installation

### What is it?

The Extreme Waterproofing System for bathroom installations combines Strataflex sheet and SubSeal liquid waterproofing membranes to provide a double layer of waterproof protection for bathrooms that require superior waterproofing protection.

This system utilizes pre-formed inside/outside corners, 6” seam tape, and polyurethane sealant to provide a complete watertight seal in tough waterproofing applications. SubSeal liquid may also be used in vertical applications of tile such as the walls in a tub/shower area.


### How It Works

Using NAC TAC or NS97 primer, 6” Seam tape is applied at the floor to wall joint, three inches on the substrate and three inches up the wall. The primer is then applied to the substrate and the Strataflex membrane is installed according to the membrane installation instructions.

Pre-formed corners are placed in the appropriate corners and secured with SubSeal. A one-part polyurethane sealant is then applied at all terminations and end seams of the membrane and seam tape.

- Strataflex provides a watertight seal and crack protection for up to 3/8” of lateral substrate movement
- Same day tile installation
- Moisture Barrier -10#/1000SF/24HRS with NAC TAC primer and 7#/1000SF/24HRS when used with NAC TAC II
- Exceeds ANSI A118.10 for waterproofing and ANSI A118.12 for crack isolation
- SubSeal cures in about two hours and eases application in hard to reach areas
- SubSeal must be fully cured prior to tile installation
- SubSeal bonds to a variety of surfaces while creating a new surface to accomodate A118.4 or better latex mortar
- Flood test in 24 hours


# Extreme Waterpoofing Systems

## Waterproofing/Sound Control Installation

### What is it?

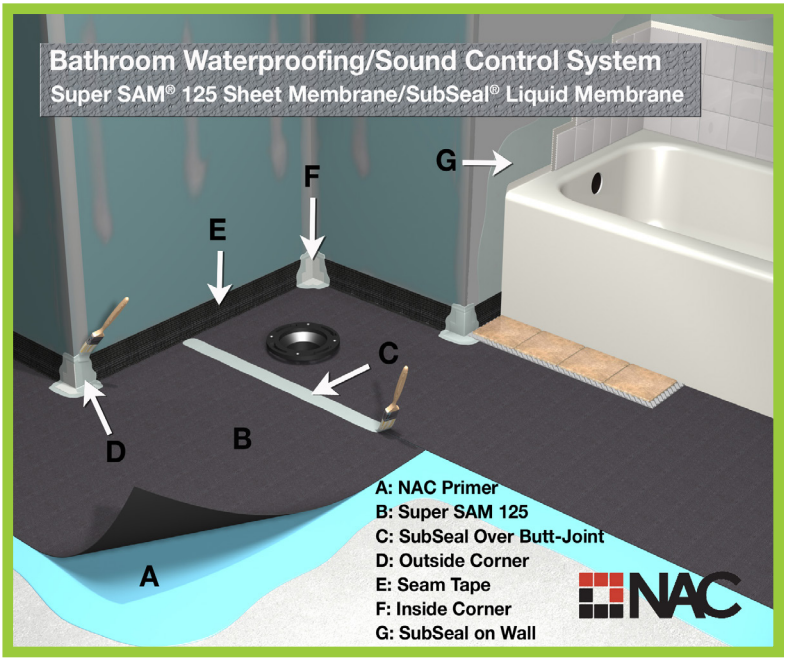
The Extreme Waterproofing/Sound Control System for bathroom installations combines Super SAM 125 sound control membrane and SubSeal liquid waterproofing membrane to provide a durable, high quality solution for bathrooms that require superior waterproofing protection with impact and audible sound reduction.

This system utilizes pre-formed inside/outside corners, 6” seam tape, and polyurethane sealant to provide a watertight seal with sound reduction. SubSeal liquid may also be used in vertical applications of tile such as the walls in a tub/shower area.

### How It Works

Using NAC TAC or NS97 primer, 6” Seam tape is applied at the floor to wall joint, three inches on the substrate and three inches up the wall. The primer is then applied to the substrate and the Super SAM 125 membrane is installed according to the membrane installation instructions.

SubSeal is applied in the corner areas and preformed corners are embedded into the wet SubSeal. A second coat of SubSeal is then applied to secure the corner. A one-part polyurethane sealant is then applied at all terminations and end seams of the membrane and seam tape.




- Super SAM 125 has a Δ 22 on 6” concrete
- IIC = 51 STC = 54 on 6” concrete
- Moisture Barrier-10#/1000SF/24HRS with NAC TAC primer and 7#/1000SF/24HRS when used with NAC TAC II
- Exceeds ANSI A118.10 for waterproofing, ANSI A118.12 for crack isolation, and ANSI A118.13 for sound control

- Super SAM 125 provides a watertight seal, and crack protection for up to 3/8” of lateral substrate movement
- SubSeal bonds to a variety of surfaces while creating a new surface to accomodate A118.4 or better latex mortar
- SubSeal must be fully cured prior to tile installation
- Same day tile installation

# Extreme Waterproofing Systems Companion Products


## NAC TAC Interior/Exterior Primer

NAC TAC primer is designed for use with interior and exterior applications of NAC sheet membranes. This non-flammable, neoprene-based primer is the ideal solution for below grade, on grade and above grade applications.

The premixed formula requires no thinning and will not re-emulsify. Once applied, the primer sets up within about 15-30 minutes and is ready for membrane application.

**Coverage: Approximately 375-425 square feet per gallon***


## NAC TAC II Interior Primer

NAC TAC II primer is designed for interior applications of NAC sheet membranes. This non-flammable, water-based primer is certified Clean Air GOLD, contains no VOCs and is the ideal solution for on-grade and above-grade applications.

The premixed formula requires no thinning and will not re-emulsify. Once applied, the primer sets up within about 15-30 minutes and is ready for membrane application.

**Coverage: Approximately 375-425 square feet per gallon***


## NS97 Exterior Primer

NS97 primer is designed for exterior applications of NAC membranes. This solvent-based primer is non-flammable and may be used in below-grade, on-grade and above-grade applications.

The premixed formula requires no thinning and will not re-emulsify. Once applied, the primer sets up within about 15-30 minutes and is ready for membrane application.

**Coverage: Approximately 300-400 square feet per gallon***


## Moisture Lock 101®

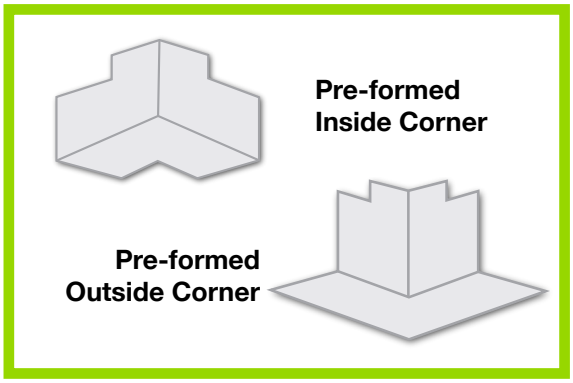
Moisture Lock 101 is a chemical floor hardener designed for porous, cementitious substrates to harden, seal and dust-proof surfaces and help reduce moisture vapor transmission (MVT).

As a clear, water-based liquid, Moisture Lock 101 penetrates and reacts with the free lime and calcium carbonate in concrete to fill and seal pores and capillaries.

**Coverage: Approximately 100-300 square feet per gallon***

***Coverage depends on applicator type and porosity of the substrate***

# Extreme Waterproofing Systems Companion Products

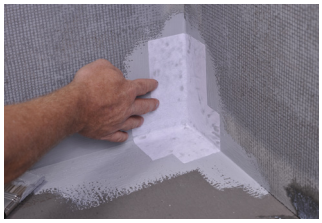



## Pre-formed Inside/Outside Corners

PFI/PFO fabric corners are used in conjunction with SubSeal liquid to provide additional support and strength to the waterproofing in corner areas.

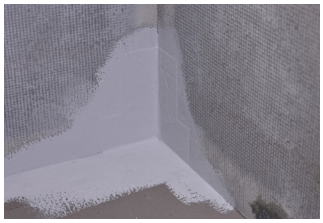
Made of a breathable material, PFI/PFO corners are low profile and durable, allowing SubSeal liquid to be absorbed into the fibers. PFI/PFO Corners allow for substrate movement in walls and floors, while assuring a strong and waterproof corner.

**Apply SubSeal to corner**



**Place PFI corner into position**

**Apply SubSeal over PFI corner**



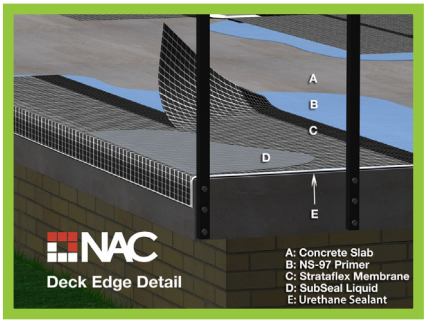
**Secure, waterproof corner**

## Seam Tape

Seam tape is a 6” wide, double stick, elastomeric tape designed for use with NAC membranes.

Seam tape can be used for interior and exterior applications to waterproof seams, joints, curbs, drains and other protrusions. It is a double-stick product but must be installed with an NAC primer for maximum adhesion.

Seam tape is NOT a stand alone product and where exposed, must be covered with membrane.




## Polyurethane Sealant

The final step in the Extreme Waterproofing System is to seal all end seams and termination points with a polyurethane sealant.

XtraBond 9500 is one example of a solvent and silicone free polymer adhesive that is flexible and provides a permanently elastic bond on the substrate.

***NAC Extreme Waterproofing System requires following the TCNA guidelines for waterproofing and control joint placement (EJ171).***

# Strataflex Technical Performance

| Assessment | Strataflex |
|---|---|
| [1]Shear Strength (5.1) A118.12<br>5.1.3<br>5.1.4<br>5.1.5<br>5.1.6 | <br>86 PSI<br>90 PSI<br>168 PSI<br>116 PSI |
| [1]Point Load Test (5.2) A118.12 | Up to 1756 pounds<br>(Exceeds ANSI requirement of 1000 lbs.) |
| [1]Mold Growth (4.1) A118.12 | Does not support mold growth |
| [1]System Crack Resistance Test (5.4) A118.12 | Meets ANSI A118.12:<br>(No cracking in grout or tile) |
| [2]Load bearing, bonded, waterproof membranes A118.10<br>M-4.1;4.2;4.3;4.4;4.5 | Exceeds ANSI A118.10 Requirements |
| [2]Shear Strength<br>M-5.3;5.4;5.5 | Exceeds ANSI A118.10 Requirements |
| [2]12-Week Shear Strength M-5.6 | 160 PSI |
| [2]100-Day Water Immersion Shear Strength M-5.7 | 95 PSI |
| [3]ASTM C-627 (Robinson) | Extra Heavy Duty |

1. A118.12 Load bearing, bonded crack isolation membranes. Test methods and minimum requirements for crack isolation membranes for thinset ceramic tile and dimension stone installation.
2. ANSI A118.10 Load bearing, bonded, waterproof membranes for thinset ceramic tile and dimension stone installation.
3. ASTM C627 Standard test method for evaluating ceramic floor tile installations systems using the Robinson floor test.

# SubSeal Technical Performance

1 Gallon = 4 gal/carton @ 40lbs. total weight

5 Gallon = 5gallon pail @ 48lbs. total weight

Shelf Life: 1 year

Freeze/Thaw: Must be protected from freezing

| Property | Test Value | Test Method |
|---|---|---|
| Mold Growth | Pass | ANSI A118.10 |
| Seam Strength | Pass | ANSI A118.10 |
| Breaking Strength | Pass | ANSI A118.10 |
| Dimensional Stability | Pass | ANSI A118.10 |
| Waterproofness | Pass | ANSI A118.10 |
| 7-Day Shear Strength | Pass | ANSI A118.10 |
| 7-Day Water Immersion Shear Strength | Pass | ANSI A118.10 |
| 4-Week Shear Strength | Pass | ANSI A118.10 |
| 12-Week Shear Strength | Pass | ANSI A118.10 |
| 100-Day Water Immersion Shear Strength | Pass | ANSI A118.10 |
| Stability in Storage | Pass | ANSI A136.10 |
| Shear Strength Room Tempera-ture | Pass | ANSI A136.10 |
| Shear Strength Wet, Type 11 | Pass | ANSI A136.10 |
| Shear Strength 28 Days | Pass | ANSI A136.10 |
| Accelerated Aging | Pass | ANSI A136.10 |
| Heat Resistance | Pass | ANSI A136.10 |
| Impact Test | Pass | ANSI A136.10 |
| Stain Test | Pass | ANSI A136.10 |
| Test for Mold Growth | Pass | ANSI A136.10 |

***Contact NAC Corporate Office for full test results.***


800-633-4622
www.nacproducts.com