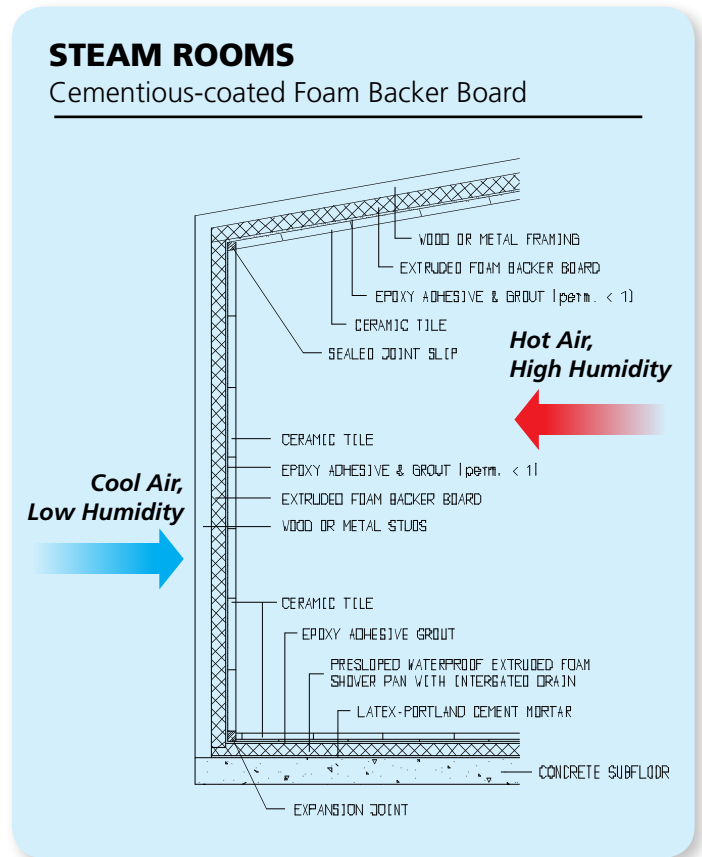


# Higher Standards for Exceptional Installations

Most of you have already seen the new **TCNA Handbook for Ceramic Tile Installation 2011**. One newly revised application instructs installers on how to build safer and more sustainable steam rooms.

This includes creating a strong vapor barrier to keep water vapor from penetrating through your wall installation into the substrate, which can cause damage due to condensation. The hot temperature (ca 110°F) and resulting high air pressure will force the vapor-saturated air on the inside of the steam room to attack the wall behind which there is a much cooler lower pressure environment. Because the inside environment is then forced to equalize the differential imbalance which can only occur if air and vapor can penetrate the wall and reach the other side. This inevitably causes damage. Therefore, we must contain the air and vapor flow and build up a barrier on the inside, the warm side, of the steam room. This barrier must be strong enough to retard water and water vapor. *(See illustration.)*



Although the TCNA added numerous precautionary sections making clear that a suitable membrane and installation system must be used to prevent moisture migration, it will remain impossible for installers and designers to determine the vapor retarding strength of their systems so long as many manufacturers of waterproof membranes (liquid or sheet applied) do not test and/ or publish their capabilities. The strength of a vapor retarder is measured in PERMS (permeability of a material). It was common industry standard to qualify any waterproof membranes tested with a result of 1 PERM or less as a sufficient vapor retarder. Many waterproofing membranes do not pass this test. For example, a PERM rating can be as high as 5 PERMS while still passing regular waterproofing tests such as ANSI 118.10-1999.

The test method for vapor retarding capabilities and PERMS determination used today is ASTM E96 and consists of test methods A-E. The applicable method under which to test is method E that reflects temperature and moisture extremes closer to real steam rooms. This test is actually not designed for the steam application we are facing but made for facade applications subject to less vapor pressure. It is however the only current method we can technically use in North America today, as test laboratories have not developed more specific steam room fitting set ups and standards. Standards Organizations such as ANSI or ASTM have yet to recognize the need to define a specific standard. Some manufacturers of membrane systems who do publish PERM ratings have conveniently not tested using the appropriate method E, achieving a good but not realistic PERM rating, putting your installation at high risk.

It's not surprising that fitting standards for steam rooms have not yet been developed in the U.S. Steam rooms and comparable applications have been imported from overseas, from places like Russia, Turkey and other European countries, where these applications have been used for ages. This long history has led to the development of rigorous industry standards based upon the lessons learned from centuries of successes and failures.

The U.S. has not had this type of history. Beginning in the early 90's, the use of steam rooms within concepts of "well-being" developed into a highly commercialized trend and has today become a booming industry for our trade. Unfortunately, this has not given the U.S. much time to develop, test and set similar standards.

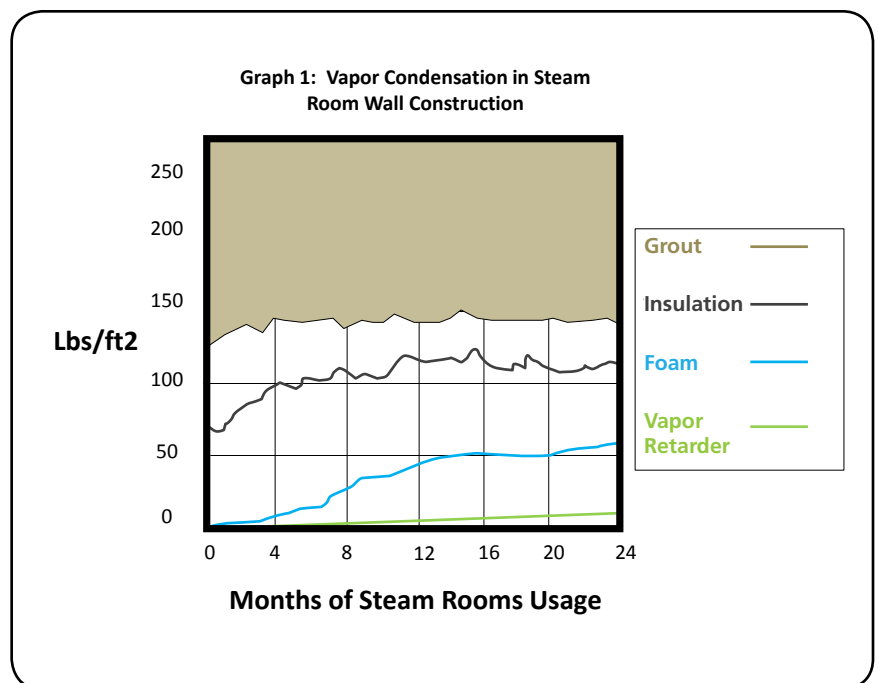
In Europe, a permeability rating is expressed as a "SD Value," comparing the strength of a vapor retarder to an equivalent of thickness of an air layer diffusing the vapor. The formula for the European SD requirements is based on long-term

tests in actual steam rooms. This has helped to safeguard the high investments of builders while minimizing the tremendous financial risk for tile setting companies who take on projects using these materials.

For us to compare permeability ratings in U.S. with the "permeability or resistance" ratings in Europe, we can use a mathematical equation to determine whether our U.S. rating is set too low.

**The Formula is (PERM = 3400/( $\mu$  \* d(mm)))**

To put this in practical and visual terms, see **Graph 1**.



Here, a steam room wall was equipped with an insulated backer board that had a vapor retarder (a standard waterproof sheet membrane) applied on the humid inside, tile adhesive and grout. On the Y-axis, the rate of water vapor and water saturation in the different layers is measured over time, represented on the X-axis.

In the application, the strength of the vapor retarder or membrane was .68 PERMS and thereby stronger than our U.S. minimum required strength of 1. As you can see in the chart, the vapor retarder still fails over time and the backer board or wall cavity becomes saturated with condensation.

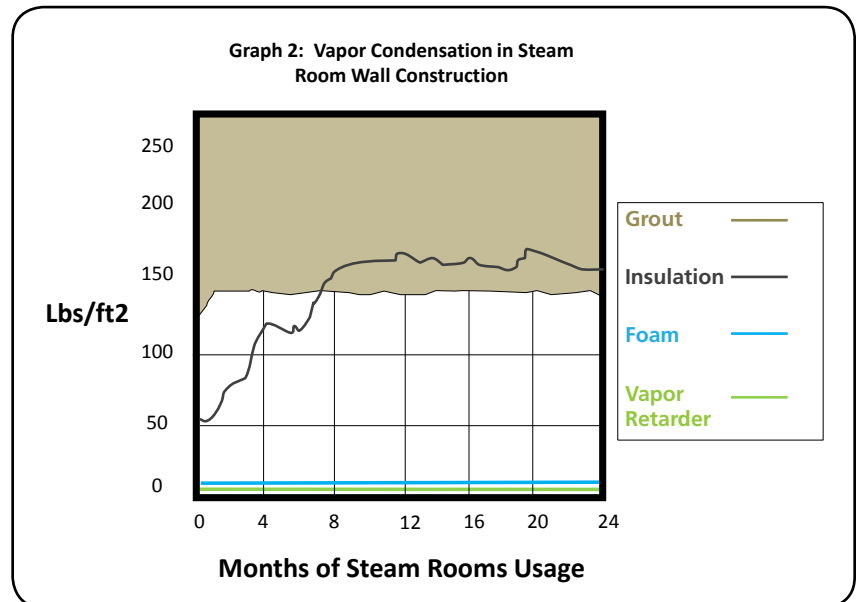
In **Graph 2**, the vapor retarder has the strength of .15 PERMS and the wall assembly and vapor retarder withstands the vapor pressure and stays dry.

The tests were done under commercial conditions with the steam room operating 24 hours. As a result, we should rethink our approach to safe recommendations for steam room vapor proofing and come to the conclusion that commercial ratings should be set around the .15 PERMS rating; residential ratings, where small steam rooms are only used for minutes rather than hours, should be set to at least .5 PERMS.

This can be achieved with a few liquid membranes and sheet-applied membranes — especially with liquid dedicated vapor retarder systems on latex or epoxy basis. Some installation related products such as epoxy based thinsets (if flat troweled before combed) and solid epoxy grouts can add to the Perm strength of an assembly as well, but do not state a 100% guaranteed pinhole free insurance.

When it comes to the installation of steam rooms, we still see the same reluctance from many manufacturers and installers when it comes to the topic of waterproofing in regular wet areas, such as showers. It is a matter of fact that only 100% waterproofing behind a tile installation keeps your shower safe. Only water resistance in a backer board cannot be enough. The same principle applies for steam rooms — vapor proof is a must. Grey zones should not be promoted or supported for the sake of short-term sales of products or installations. It will likely back-fire.

Please ask your preferred product manufacturers about permeability ratings for their membrane systems, whether these tests cover the recommended treatment of seams,



fasteners and protrusions. The whole system should be equally vapor proof and manufacturers should provide proof for their claims. Talk to manufacturers about tile adhesives and grout too. Their products must withstand the demanding environment of steam rooms and have proof.

Many experienced steam room tradesmen prefer epoxy-based materials for good installations. Equally important is to choose tile or stone wisely. Very porous material will take on a lot of condensation, staying wet for a long time, which provides an environment ideal for mold growth. Many special considerations must be taken into account when it comes to steam rooms. Nevertheless, the rewards are huge if it works out.

Let us all make sure the exciting world of steam rooms and other wellness applications develop into a highly profitable, creative market for our trade. The art of tile setting can be challenging which is also securing our jobs but it can come with financial disasters if it goes wrong. **You owe it to your company's "well being" to be informed and prepared with the best industry knowledge and the best products.**

# wedi® Liquid Vapor Barrier AEA-VBC

## Technical Data Sheet

**Formulated for wedi applications - made by Advanced Eco-Adhesives**

### **Description and Use:**

For use in large and commercial steam room installations to protect wall construction against and eliminate aggressive vapor diffusion. Where conventional waterproofing systems are not sufficient. Vapor-proofing membranes applied as liquids are used extensively in the construction industry. Typical uses include:

- ✓ **Over wedi products in steam room applications incorporating seams, fastener heads, extensive use**
- ✓ **On substrates prior to application of thin-set mortar for ceramic tile**
- ✓ **As a coating for plywood, OSB or exterior grade gypsum**
- ✓ **As part of a roof coating system**
- ✓ **As a secondary moisture protection system for caulks, sealants or films**
- ✓ **For bridging cracks**
- ✓ **As a vapor barrier over concrete slabs (application thickness depends on smoothness of surface)**
- ✓ **As a liquid water proofer over cement board**

Proprietary vapor barrier coating copolymer latexes from Advanced Eco-Adhesives are recommended to be applied by brush, roller, trowel, or spray. Application typically consists of two layers one applied 90 degrees to the other to eliminate voids that would allow moisture penetration. Dry thickness is approximately 1/16". Cure is by evaporation. Once cured, these systems offer excellent flexibility and water vapor resistance.

Liquid-applied membranes are excellent for irregular surfaces and vertical surfaces. In addition, various types of liquid-applied membranes can be "self-healing" should they be pierced prior to cure or drying.

**Table 1: Barrier Coating - Typical Properties**

pH	8.0 +/-1
Viscosity, (cps)†	2500-3500
Wt./Gallon (lb.)	8.3 – 8.4

†Brookfield RVF #1 spindle @ 20rpm



## Advantages and Benefits

Compared to other one-component or two-component systems, including epoxy/asphalt and acrylic/urethane, damp-proofing membrane utilizing the AEA-VBC offers a broad range of benefits:

### Outstanding Performance:

- **Membranes cure to a tough, flexible film that doesn't soften at high temperatures or become brittle at low temperatures.**
- **Cured films exhibit high water resistance and low moisture vapor permeability, making them highly effective barriers.**
- **Excellent crack-bridging properties permit use in a wider range of applications compared to two-component systems.**

### Ease of Use, Economy and Safety:

- **Single-component system eliminates need for catalyst and eliminates limited pot-life problems.**
- **Overspray can be easily cleaned up with soap and water before it cures. No harsh solvents are required.**
- **Quick drying time (dry-to-touch in 30 to 60 minutes) reduces labor costs for application of multiple coats.**
- **Can be applied to damp substrates.**
- **Easy application using brush, roller or spray reduces training time and poor application results.**
- **Water-based system requires no solvents or catalysts, no high heat for application or cure, and no respirators or safety equipment other than gloves.**

### Versatility:

- **Excellent adhesion to a wide variety of substrates allows the formulator to market one product for many uses, including tile, stone, polystyrene foam, cement, gypsum wallboard, wedi building panel in steam rooms and EIFS applications.**
- **Alkali resistance allows application to alkaline substrates.**
- **Non-staining and stain-blocking performance eliminates substrate staining common to asphalt products.**
- **Easy pigmentation allows custom coloring.**

**Coverage:**

**A minimum dried coating thickness of 15 Mil is needed to provide a vapor barrier over wedi building panel surfaces in steam room applications. This should be applied in a minimum of two coats . Based on these thicknesses, a coverage rate of approximately 100 square feet per gallon is expected.**

(mils)	(In)	(cm)	(coverage(sq/ft))
> 63	1/16	0.159	25.5
> 50	1/20	0.127	31.9
> 31	1/32	0.079	51.3
> 20	1/50	0.051	79.5
> 15	1/67	0.038	106.7
> 12	1/83	0.031	130.8
> 10	1/100	0.025	162.2
> 6.6	1/150	0.017	238.6

<b>Table 2 - Test Results for Damp Proof Membrane Compound</b>		
<b>Test</b>	<b>Results</b>	<b>Comments</b>
<b>Adhesion</b>	<b>(psi)</b>	<b>AEA Tensile Bond Method</b>
<b>Cement Surface Board</b>		
7-Day Dry	41	Cohesive substrate failure
7-Day Dry/7-Day Wet	156	Cohesive substrate failure
<b>Exterior Plywood</b>		
7-Day Dry	55	Cohesive substrate failure
7-Day Dry/7-Day Wet	89	Cohesive substrate failure
<b>Polystyrene (w/o coating)</b>		
7-Day Dry	12	Cohesive substrate failure
7-Day Dry/7-Day Wet	48	Cohesive substrate failure
<b>Thin Set to Membrane</b>		
7-Day Dry	395	Tile applied to thin-set, tile failure

<b>Elongation</b>	<b>(%)</b>	<b>ASTM D-638</b>
7-Day Dry	580	
14-Day Dry	650	
21-Day Dry	562	
7-Day Dry/7-Day Wet	693	
7-Day Dry/14-Day Wet	738	
7-Day Dry/21-Day Wet	657	
<b>Permeability</b>	<b>Perms</b>	<b>ASTM DE-96</b>
	0.013	
<b>Tensile</b>	<b>(psi)</b>	<b>ASTM D-638</b>
7-Day Dry	335	
14-Day Dry	321	
21-Day Dry	345	
7-Day Dry/7-Day Wet	323	
7-Day Dry/14-Day Wet	404	
7-Day Dry/21-Day Wet	562	
<b>Water Vapor</b>		
<b>Transmission</b>	<b>(gsm)</b>	<b>ASTM E-96</b>
	0.085	
<b>Low Temp. Flex. &amp;</b>	<b>(77° F/-15°</b>	
<b>Crack Bridging</b>	<b>F)</b>	<b>ASTM C-836. Sec. 5.7</b>
	No cracks	
<b>Water Vapor</b>	<b>(77° F/-15°</b>	<b>ASTM D-751 Procedure</b>
<b>Transmission</b>	<b>F)</b>	<b>B</b>
	Passes	

### Application:

Newly prepared surfaces should be smooth and have a troweled or brushed finish. Any masonry should be flush pointed. Defects in existing surfaces should be repaired.

The surface needs to be clean and free of dust, loose material and standing water. The membrane should not be applied under wet conditions or where these conditions are likely to occur before the membrane has fully dried.

It is sometimes advantageous to pre-wet the substrate so it is damp, yet free of standing water, to improve adhesion of the liquid membrane.

Check adhesion to various surfaces by applying the product to a small sample area before starting any job.

The liquid may be applied by brush, roller, trowel or airless spray (compressed air supply pressure of 800 psi, compression rate of 28:1, tip size of .025" and a fan width of 8"). However, care should be taken to ensure the correct dry-coat thickness is applied and that the drying time is not unacceptably extended by dilution.

**Application (continued):**

The thickness of the dried membrane depends on the application requirements and method of application. For a single dry coat thickness of more than 1/32", it is recommended that the membrane be applied by airless spray. If airless spray is used, single dry-coat thicknesses of up to approximately 3/32" can be obtained.

If two coats are being applied, it is recommended that the coats be applied at right angles to each other. Before applying the second coat, it is necessary to let the first coat become dry to the touch. The time required to meet this condition will vary according to environmental conditions, but will typically be on the order of one hour. It is preferable that the second coat be applied within 24 hours after application of the first.

**Performance Data**

The information in Table 4 shows the test results for damp proof membranes (using AEA-VBC-0500).

**Packaging Unit**

1 gl, Coverage 100 sqft at 15 mil film thickness (Vapor barrier)

**Storage**

Store in a dry and cool place, storable in original packaging for 12 months.

**Safe Handling & Disposal**

KEEP CONTAINER TIGHTLY CLOSED\*KEEP OUT OF REACH OF CHILDREN\*NOT FOR INTERNAL CONSUMPTION\*FOR INDUSTRIAL USE ONLY. Wear Gloves when used. Disposal as hazardous material.

**MasterFormat™ 2004 Sections**

Division 7 / Thermal & Moisture Protection

07 10 00 Dampproofing & Waterproofing

**Warranty**

The technical information (and application instructions) is based on our experience and present knowledge. However, it is the responsibility of the user/buyer to make trials with the original substrates in order to verify the suitability of our products for the intended purpose, taking into consideration all application parameters. wedi's responsibility and liability with respect to defective products and / or work attaching thereto shall be confined solely to the replacement of the same. In addition, wedi has the right to reimburse the buyer the purchase price paid with respect thereto rather than to replace the defective products.