



RADCO TEST REPORT
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LATICRETE® Hydro Ban® Evaluated per ICC ES AC212

Prepared for

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1.0 INTRODUCTION

At the request of LATICRETE International, Inc., RADCO conducted tests on LATICRETE® Hydro Ban® in accordance with the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

2.0 OBJECTIVE

The objective of these tests was to evaluate the properties of LATICRETE® Hydro Ban® with one joint treatment LATICRETE® Hydro Ban® and LATICRETE® Waterproofing Anti-Fracture Fabric, in accordance with the tests listed in section 3.0.

3.0 TEST PROGRAM

<u>TEST</u>	<u>REFERENCED STANDARDS</u>
1. Tensile Bond	ASTM C297
2. Freeze Thaw	AC212
3. Water Resistance	ASTM D2247
4. Water Vapor Transmission	ASTM E96
5. Water Penetration	ASTM E331
6. Transverse Load	ASTM E1233
7. Racking Shear	ASTM E72
8. Restrained Environmental Cycling	AC212
9. Water Penetration	ASTM E331
10. Ultraviolet Light	AC212
11. Accelerated Aging	AC212
12. Hydrostatic Pressure	AATCC127
13. Air Permeance	ASTM E2178



4.0 TEST SPECIMENS

Product Descriptions

LATICRETE® Hydro Ban® is a single component self curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane. See attached product description sheet in the appendix for complete details.

LATICRETE® Waterproofing Anti-Fracture Fabric is used for bridging gaps over 1/8" (3 mm).

Test Specimen Preparation

The materials used to fabricate the test samples were submitted by LATICRETE International, and received on March 10, 2011. The substrates were provided by RADCO. The materials used for this testing are representative of the standard manufactured products as indicated by a sampling affidavit which is attached in the appendix. All test specimens were prepared by LATICRETE International personnel during the week of March 21, 2011 at RADCO's testing facility in Long Beach, California. The fabrication procedures followed were observed and documented by RADCO.

Substrates Tested For the Small Scale Tests:

½" (12.7 mm) DensGlass Gold Sheathing compliant with ASTM C1177

½" (12.7 mm) Cement Board Sheathing compliant with ASTM C1325

Flashing Material Tested:

Aluminum

Copper

Galvanized Steel

Polyvinyl Chloride

Painted Aluminum

Application on the ½" DensGlass Gold Sheathing for all testing:

LATICRETE® Hydro Ban® was applied over the joint to receive a one 6-inch wide strip of LATICRETE® Waterproofing Anti-Fracture Fabric. Strips of the 6-inch LATICRETE® Waterproofing Anti-Fracture Fabric were cut and placed at the joint in the wet LATICRETE® Hydro Ban®. The 6-inch wide strip was embedded within the LATICRETE® Hydro Ban® with a minimum overlap of 2-inches at the head joints. A two-coat application of LATICRETE® Hydro Ban® was then applied over the surface of each test specimen with a ¾" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied.

Application on the ½" Cement Board Sheathing for all testing:

The cement board was wiped with a damp sponge to remove any dust. Then a cement backer board self-adhering alkaline resistant fiber tape was applied to all joints. Mixed 254 Platinum adhesive was applied over the fiber tape at 1/16" thick and allowed to dry before the LATICRETE® Hydro Ban® was installed. A two-coat application of LATICRETE® Hydro Ban® was then applied over the surface of each test specimen with a ¾" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied.

Application on each 2-inch square Flashing Material:

Each flashing material was cleaned before application. Two coats of LATICRETE® Hydro Ban® were applied with a paint brush. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied.

5.0 Flatwise Tensile Strength of Sandwich Constructions, ASTM C297-94

Sample Preparation: Samples were prepared in accordance with Section 4.1 of AC212 under the supervision of RADCO on March 21, 2011.

Two (2) 2 inch (51 mm) by 4 inch (102 mm) pieces of each substrate were used for each sample. A 1/8 inch (3.2 mm) tile spacer was used to maintain a joint between the two pieces. The water resistive coating and joint tape was applied as described in section 4.0. A total of five (5) 4" x 4" (102 mm x 102 mm) specimens for each substrate were prepared as shown in the attached detail.

Test Setup, Procedure & Results

The testing was conducted per section 4.1 of AC212 and ASTM C297 by applying tensile loads normal to the plane of the system to determine the bonding characteristics. Each test specimen was cemented on both sides to 3/8" thick (9.5 mm), 5" x 8" (122.5 mm x 203.2 mm) metal plates using epoxy; the assembly was then left to cure for 48 hours at 73 ± 2 °F (23 ± 1 °C) and 50 ± 5% relative humidity prior to testing. Hardman Adhesives general purpose epoxy was used to cement the surfaces. Note: 2" metal cube loading blocks were used in all tests on the flashing material.

The metal plates were then inserted horizontally into the bond strength testing fixture. The test fixture was attached to a United Universal Testing Machine equipped with an electronic load cell and a computerized data collection system. A tensile load was applied at a constant rate of approximately 0.01 inch/minute such that failure occurred between three (3) and six (6) minutes. The ultimate load and type and location of failure was recorded.



The following table contains the average tensile strength results of the two substrates prepared as described above in section 4.0.

Test Specimen Type	Average Tensile Strength		Mode of Failure
	PSI	kPa	
1/2" DensGlass Gold	24.75	170.65	Failure occurred at the substrate
1/2" Cement Board	20.87	143.90	Failure occurred at the substrate

The following table contains the average tensile strength results of five flashing materials prepared as described above in section 4.0.

Test Specimen Type	Average Tensile Strength		Mode of Failure
	PSI	kPa	
Aluminum	545.93	3764.05	Failure Mode 1 (see below)
Copper	215.83	1488.10	Failure Mode 1 (see below)
Galvanized Steel	529.64	3651.74	Failure Mode 1 (see below)
Polyvinyl Chloride	273.15	1883.30	Failure Mode 1 on samples 3,4 Failure Mode 2 on samples 1,2,5 (see below)
Painted Aluminum	367.97	2537.06	Failure Mode 2 (see below)

The tests were conducted in June 2011.

Failure Mode 1: At the epoxy/metal loading block interface, the surface with the LATICRETE® Hydro Ban® remained unaffected.

Failure Mode 2: At the LATICRETE® Hydro Ban®/substrate interface.

Condition of Acceptance: The flatwise tensile strength of each specimen shall be a minimum of 15 psi (103.4 kPa)

Conclusion: LATICRETE® Hydro Ban® met the minimum 15 psi (103.4 kPa) tensile strength requirements when used with the substrates and flashing materials shown in the two result tables above per section 4.1 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

6.0 Freeze Thaw Test per AC212

Sample Preparation: Samples were prepared in accordance with Section 4.2 of AC212 under the supervision of RADCO on the week of March 21, 2011.

Two (2) 3 inch (76 mm) by 6 inch (152 mm) pieces of each substrate were used for each sample. A 1/8" (3.2 mm) tile spacer was used to maintain a joint between the two pieces. The water resistive coating and joint tape was applied as described in section 4.0. A total of five (5) 6" x 6" (152 mm x 152 mm) specimens for each substrate were prepared as shown in the attached detail.

Test Setup, Procedure & Results

The back and sides of each specimen were sealed with General Electric 100 % silicone rubber sealant before testing. The test was conducted in accordance with section 4.2 of AC212.

The test specimens were subjected to ten (10) freeze-thaw cycles. Each cycle consisted of air drying at 120 °F (49 °C) temperature for a minimum of eight (8) hours followed by total immersion in water at 70 °F to 80 °F (21.1 °C to 26.7 °C) for eight (8) hours and exposure to a temperature of -20 °F (-28.9 °C) for sixteen (16) hours.

The test was conducted in April and May 2011.

Condition of Acceptance: Failure is defined as surface changes as viewed under minimum 5X magnification, such as checking, crazing, erosion, delamination, or indications of delamination between components, or other characteristics that may affect performance as a water-resistive barrier.

All five (5) specimens for each of the two (2) substrates were carefully examined under 5X magnification at the end of the test.

Specimen Substrate	No. of Specimens	Results
1/2" DensGlass Gold	5	Passed 10 cycles
1/2" Cement Board	5	Passed 10 cycles

Conclusion: No signs of failure as described above were observed in any of the test specimens when examined under 5X magnification at the end of the 10-cycle test. All specimens comply with the freeze thaw test requirements of Section 4.2 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

7.0 Water Resistance Test of Coatings in 100% Relative Humidity, ASTM D2247-97

Sample Preparation: Samples were prepared in accordance with Section 4.3 of AC212 under the supervision of RADCO on the week of March 21, 2011.

Two (2) 2 inch (51 mm) by 6 inch (152 mm) pieces of each substrate were used for each sample. A 1/4 inch (6.4 mm) tile spacer was used to maintain a joint between the two pieces. The water resistive coating and joint tape were applied as described in section 4.0. A total of three (3) 4" x 6" (102 mm x 152 mm) specimens for each substrate were prepared as shown in the attached detail.

Test Setup, Procedure & Results

The back and sides of each specimen were sealed with General Electric 100 % silicone rubber sealant before testing. The test was conducted in accordance with ASTM D2247-97, "Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity".

Equipment: Singleton Corporation, 18 cubic feet (510 liters) environmental test chamber, SCHH series, model #21, equipped with microprocessor based programable temperature controllers. The test was conducted in a corrosion-resistant chamber equipped with a constant level 10 gallon reservoir. The conditions in the chamber were maintained at 100°F (38°C) and 100% relative humidity for the entire period of testing. The temperature of the saturated air and water vapor mixture was 100 ± 4 °F (38 ± 2° C). The testing period was 14 days without interruption.

The test specimens were supported from below in slotted racks and maintained at 15° from the vertical. Care was taken to ensure that none of the specimens came in contact with each other, any metallic material, or any material capable of acting as a wick. Condensation from one specimen was not permitted to drip on any other specimens.

All specimens were visually examined (without magnification) daily for any deleterious effects due to water exposure. At the end of the 14-day test period, the specimens were wiped dry and examined (without magnification) between 5 and 10 minutes after removal from the chamber. All specimens were again examined after a 24-hour recovery period.

The test was conducted in April and May 2011.

Specimen Substrate	No. of Specimens	Results
1/2" DensGlass Gold	5	Passed 14 day exposure
1/2" Cement Board	5	Passed 14 day exposure

Condition of acceptance: The absence of deleterious effects from 14 days of exposure to water.

Conclusion: No signs of cracking, crazing, blistering, erosion or other deleterious effects were observed in any of the test specimens in any of the three substrates. All specimens tested comply with the water resistance test requirements in accordance with Section 4.3 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

8.0 Water Vapor Transmission Test, ASTM E96-00e01

Sample Preparation: Samples were prepared in accordance with Section 4.4 of AC212 under the supervision of RADCO on the week of March 21, 2011.

A two-coat application of LATICRETE® Hydro Ban® was applied over the surface of a nonadhesive sheet with a 3/4" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied.

After curing for a minimum of 28 days, the film was removed from the nonadhesive sheet and tested as described below.

Test Setup, Procedure & Results

The test was conducted per ASTM E96-00e01, Standard Test Methods for Water Vapor Transmission of Materials, Water Method (Procedure B).

Samples were conditioned for a period of not less than 40 hours at a temperature of 73.4 ± 4 °F and a relative humidity of $50 \pm 5\%$ prior to testing.

The test chamber was maintained at a constant $73.4^{\circ}\text{F} \pm 1$ °F and $50\% \pm 2\%$ relative humidity. Three free film samples were tested. The test was conducted in May and June 2011.

Note: No change in specimen mass occurred due to conditioning.

- Test Equipment:
1. Mitutoyo Digital Caliper 0 to 6"
 2. Sartorius Model GP3202 Electronic Digital Scale
 3. Apparatus for water vapor transmission tests manufactured in accordance with ASTM E96

The following values for WVT and Permeance were obtained.

Sample ID	Thickness (in.)	WVT (grams per 24 hr.m ²)	Permeance (perms) (grains per hr.in.Hg.ft ²)
1	0.031	6.244	0.921
2	0.038	7.077	1.043
3	0.038	7.077	1.043
Average	0.036	6.799	1.002
Standard Deviation	0.004	0.481	0.070

The material meets the requirements for Grade C water resistive barriers per ICC ES Acceptance Criteria for Water-resistive Barriers, (AC38).

Conclusion: LATICRETE® Hydro Ban® complies with the requirements of Section 4.4 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

9.0 Water Penetration Test, ASTM E331-00

Test Specimen Preparation

Framing: Each wall panel assembly was 4'0" by 8'0", and constructed with nominal 2x4 Spruce Pine Fir (SPF) stud grade wood studs spaced at 16" o.c. The studs were fastened to the top and bottom plates with 2-16d common nails. The top and bottom plates were nominal 2x4 Spruce Pine Fir stud grade wood plates.

Sheathing: 1/2" (12.7 mm) thick DensGlass Gold sheathing was attached to 16" o.c. framing members with 6d, 2" common nails spaced 6" on center in the perimeter and 12" on center in the field. The panels included one (1) horizontal and two (2) vertical joints with a 1/8" gap at all joints. All joints were filled with one application of LATICRETE® Hydro Ban® to receive a one 6-inch wide strip of LATICRETE® Waterproofing Anti-Fracture Fabric. Strips of the 6-inch LATICRETE® Waterproofing Anti-Fracture Fabric were cut and placed at the joints in the wet LATICRETE® Hydro Ban®. The 6-inch wide strip was embedded within the LATICRETE® Hydro Ban® with a minimum overlap of 2-inches at head joints. A two-coat application of LATICRETE® Hydro Ban® was then applied over the surface of each test specimen with a 3/4" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied. The three panels were allowed to cure a minimum of 28 days prior to testing. Three (3) 4 ft. x 8 ft. (1219 mm x 2438 mm) panels were fabricated.

Test Setup, Procedure & Results

The test was conducted per ASTM E331-00, *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*. The tests were conducted in a chamber designed to test two 4ft. x 8ft. (1.22 m x 2.44 m) panels. The water spray system consisted of a grid of spray nozzles and was calibrated to assure that it delivers a uniform spray of water to the exterior face of the test specimens at a minimum rate of 5.0 US gal./ft.²/hr. The negative pressure was achieved by evacuating the air inside the test chamber using a vacuum pump. The pressure was measured using a Dwyer Instruments inclined manometer capable of reading pressure in 0.02 inch increments of water column (w.c.). This reading was converted to psf using the relation 1" of w.c. = 5.20 psf.

The panels were mounted in the test chamber with the exterior face facing the water spray and interior face facing the negative pressure chamber. The outside perimeter of the panel was sealed with caulking material and a 3/8" (9.5 mm) rubber gasket to create a water and air tight seal.

Water Penetration

The panels were subjected to a uniform water spray at a minimum rate of 5.0 gallons per square foot per hour (3.4 L/m² min), and a simultaneously applied pressure differential on the panel surface of 0.55 in. H₂O of water column pressure (2.86 psf) (136.94 Pa). The water spray and pressure was maintained on the panel for 15 minutes during which time the interior surface was constantly monitored for water penetration. The test was conducted at RADCO's Long Beach, CA test facility on May 11, 2011.

Two Additional Tests not required by ICC ES AC212

Two additional tests were conducted immediately following the 15 minute test at the request of Laticrete International. The additional tests are not required by the acceptance criteria.

The test described above was continued for an additional 15 minutes at a pressure differential of 6.24 psf (299 Pa). After the three panels were tested for water penetration at 2.86 psf, the three test panels were then subjected to a pressure of 6.24 psf.

Following the 6.24 psf, 15 minute test, the differential pressure was increased from 6.24 psf to 12.0 psf for each panel.

Condition of Acceptance: There shall be no visible water penetration at sheathing joints, as viewed from the back of the panel.

Conclusion: There was no visible water penetration at sheathing joints or any other location, as viewed from the back of the panel, during or at the end of the 15 minute, 2.86 psf test and at the end of the two additional tests (15 minute at 6.24 psf & 15 minute at 12.0 psf) in any of the three (3) panels tested. The three (3) panels tested comply with the requirements of section 4.5 of the ICC ES AC212, Approved June 2011.

10.0 Structural, Racking, and Restrained Environmental Conditioning Tests per AC212

Test Specimen Preparation

The materials used to fabricate the test samples were submitted by LATICRETE International, and received on March 10, 2011. The substrates were provided by RADCO. The materials used for this testing are representative of the standard manufactured products as indicated by a sampling affidavit which is attached in the appendix. All test specimens were prepared by LATICRETE International personnel during the week of March 21, 2011 at RADCO's testing facility in Long Beach, California. The fabrication procedures followed were observed and documented by RADCO.

Panel Configuration

RADCO constructed the wood frame as specified in ASTM E 72, Fig 6, using nominal 2 x 4 (1-1/2" x 3-1/2") No. 1 Grade Doug-Fir-Larch lumber at 16" o.c. 1/2" (12.7 mm) thick DensGlass Gold sheathing compliant with ASTM C1177 was fastened with No. 6, 1-1/4 inch (31.7 mm) long, Type W bugle head screws to the wood frame by RADCO personnel on the week of March 24, 2011. The sheathing was installed as specified in Section 4.7.1 of AC212 and as shown on the attached sketch. 1/8" tile spacers were used to create two vertical joints and one horizontal joint. Fasteners attaching the sheathing to the frame were placed at 6" o.c. in the perimeter and 12" o.c. in the field.

All fastener heads were filled with one application of LATICRETE® Hydro Ban®. All joints were filled with one application of LATICRETE® Hydro Ban® to receive a one 6-inch wide strip of LATICRETE® Waterproofing Anti-Fracture Fabric. Strips of the 6-inch LATICRETE® Waterproofing Anti-Fracture Fabric were cut and placed at the joints in the wet LATICRETE® Hydro Ban®. The 6-inch wide strip was embedded within the LATICRETE® Hydro Ban® with a minimum overlap of 2-inches at the head joints. A two-coat application of LATICRETE® Hydro Ban® was then applied over the surface of the test specimen with a 3/4" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied. The panel was allowed to cure a minimum of 28 days prior to testing. Galvanized flashing was applied over the surface of the sheathing and screw attached to the frame at 16" o.c. and the LATICRETE® Hydro Ban® was roller applied to tie the flashing to the DensGlass Gold sheathing. One (1) 8 ft. x 8 ft. (2438 mm x 2438 mm) panel was fabricated.

10.1 Transverse Load (Structural) Test, ASTM E1233-97

Test Setup, Procedure & Results

The panel was first tested in accordance with ASTM E1233-97, "Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential" (Procedure A).

An 8 ft. long 2x4 was fastened to the top and bottom plate of the test specimen with 1/2" diameter bolts. The test specimen was placed horizontally in the vacuum chamber such that the 2x4's rested on a 3½" wide surface, thus allowing the full 8 ft. length of the test specimen to be subjected to the applied load.

The test panel was covered with a 6 mil thick polyethylene sheet, folded over the sides of the fixture and sealed to the floor to create the vacuum chamber. The sheet was loosely applied with excess folds and gathers at corners and recesses to assure full coverage of the test frame and specimen. Consequently, there were no fillets caused by the tightening of the sheet over supports during load application.

The following test equipment was utilized:

- Vacuum pump
- Computerized Data Acquisition Equipment
- Digital Dial Indicators with 4" travel accurate to 0.0001"
- Digital Water Column Manometer capable of measuring to 120" in 0.1" increments of water column pressure

The load was applied by evacuating the air below the test specimen using a vacuum pump. The applied load was measured with a digital manometer capable of reading in 0.1 inch increments of water column. Deflections were taken using digital dial indicators capable of reading in 0.0001" increments. Deflection readings were taken at three locations across the panel width at mid height. Deflection readings were also taken at two locations at the midpoint along the top and bottom 2 x 4's.

The panel was submitted to 10 positive cycles of loading with a one-minute recovery period between each cycle. The applied load was held for one minute (A minimum of 30 seconds is necessary for the load and panel deflections to stabilize) The load was applied such that the panel achieved a net deflection of 0.40" [$L / 240$ or $96/240=0.40$]. Deflection readings were taken at each load increment, and after the load was released (set). The load required to achieve a net deflection of 0.4" was approximately 24 psf. The test was conducted at RADCO's testing facility in Long Beach, California on May 4, 2011.

Conditions of Acceptance: There shall be no cracking of the water resistive coating as determined by visual examination within the field of the panel, at the joints, and the interface of the flashing.

Conclusion: No signs of cracking or tearing of the water resistive coating were observed in the field of the panel, at the substrate joints and at the interface of the flashing. The panel tested complies with the requirements of section 4.7.1 of the ICC ES AC212, Approved June 2011.

10.2 Racking Shear Test, ASTM E72-02

Test Setup, Procedure & Results

The test was conducted per ASTM E72-02, "Standard Test Methods of Conducting Strength Tests of Panels for Building Construction" using the test fixture described in Figure 7. The bottom edges of the panel facing material were held 3/4" above the base to ensure against direct vertical bearing or frictional shear resistance of the facings against the test equipment framing. The 8 ft. x 8 ft. test panel was attached at its base to the C channel of the test fixture with 1/2" diameter bolts at 16" on center, one in each bay. The load was applied with a 25 ton hydraulic jack and measured with a load cell and digital readout. The load was applied to a notched 4x4 attached to the panel top plate.

Dial indicators accurate to 0.0001" were provided to measure the displacement of the specimen during test. The dial at the lower right corner (Dial #3), below the point of load application, measured the amount of lift (rotation), the dial at the lower left corner (Dial #2) measured the slippage of the sample, and the dial at the upper left corner (Dial #1) measured the total deformation of the wall (including the slip and lift). The total deflection of the sample for each loading was the reading of the dial at the upper left minus the readings of the other two dials (Dial #1 - Dial #2 - Dial #3).

The load was applied in 100 lb. increments. Deflection readings were taken at each load increment. A 100 lb. pre-load was applied before starting the test. The rate of loading was approximately 400 lbs. per minute. Hold-downs were provided per ASTM E72 and the total initial force in each rod did not exceed 20 pound-force. The test was terminated when a net deflection of 0.125" (1/8") was achieved. The load required to achieve a net deflection of 0.125" was 650 lbs. The test was conducted on May 16, 2011.

The surface of the test panel was continually observed for any signs of cracking or tearing of the water resistive coating.

Conditions of Acceptance: There shall be no cracking of the LATICRETE® Hydro Ban® as determined by visual examination within the field of the panel, at the joints, and the interface of the flashing.

Conclusion: No signs of cracking or tearing of the water resistive coating were observed in the field of the panel, at the substrate joints and at the interface of the flashing. The panel tested complies with the requirements of section 4.7.2 of the ICC ES AC212, Approved June 2011.

10.3 Restrainted Environmental Conditioning

Test Setup, Procedure & Results

The entire surface of the test panel was subjected to five cycles of the following uniform exposure conditions:

1. Water Spray 24 hours
2. Radiant Heat 24 hours

Test Equipment:

1. Multiple channel thermocouple temperature indicator
2. Non-contact Infrared Indicator
3. Methane Gas Heating Chamber
4. Water sprinkler/spray system

Water Spray: The water spray was applied at the top of the test panel along the entire width and the spray areas had sufficient overlay so that a continuous sheet of water flowed down the face of the panel. The panel was mounted on a rigid platform that held the panel vertical. The sides and back of the assembly were protected from moisture.

Radiant Heat: Four 1 mm thick aluminum plates painted mat black were fixed symmetrically to the face of the test panel. Thermocouples attached to the surface of these plates were used to measure the temperature. Thermocouple #5 was the ambient temperature. The thermocouples were connected to a digital temperature indicator and temperature readings were recorded at 1 hour intervals.

The radiant heating was conducted using four (4) Methane-gas burners symmetrically distributed in an insulated heating chamber. The temperature on the surface of the panels was also checked several times a day using a Non-contact Infrared Indicator gun. The temperature was maintained at 120 ± 5 °F (48.9 ± 2.8 °C).

Periods of exposure to ambient conditions did not exceed 48 hours. The test was conducted from May 23 to June 11, 2011.

Conditions of Acceptance: There shall be no cracking of the water resistive coating as determined by visual examination within the field of the panel, at the joints, and the interface of the flashing.

Conclusion: No signs of cracking or tearing of the LATICRETE® Hydro Ban® were observed in the field of the panel, at the substrate joints and at the interface of the flashing. The panel tested complies with the requirements of section 4.7.3 of the ICC ES AC212, Approved June, 2011.

10.4 Water Penetration Test, ASTM E331-00

Test Setup, Procedure & Results

The test was conducted per ASTM E331-00, "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference." The test was conducted in a chamber designed to test one 8ft x 8ft. (2.44 m x 2.44 m) panel. The water spray system consisted of a grid of spray nozzles and was calibrated prior to conducting the test to assure that it delivers a uniform spray of water to the exterior face of the test specimens at a minimum rate of 5.0 US gal./ft.²/hr. The negative pressure was achieved by evacuating the air inside the test chamber using a vacuum pump. The pressure was measured using a Dwyer Instruments inclined manometer capable of reading pressure in 0.02 inch increments of water column (w.c.). This reading was converted to psf using the relation 1" of w.c. = 5.20 psf.

The panel was mounted in the test chamber with the exterior face facing the water spray and interior face facing the negative pressure chamber. The outside perimeter of the panel was sealed with caulking material and a 3/8" (9.5 mm) rubber gasket to create a water and air tight seal.

The panel was subjected to a uniform water spray at a minimum rate of 5.0 gallons per square foot per hour, and a simultaneously applied pressure differential of 2.86 psf (137 Pa). The water spray and pressure was maintained on the panel for 15 minutes during which time the interior surface of the panel was constantly monitored for water penetration.

Two Additional Tests not required by ICC ES AC212

Two additional tests were conducted immediately following the 15 minute test at the request of Laticrete International. The additional tests are not required by the acceptance criteria.

The test described above was continued for an additional 15 minutes at a pressure differential of 6.24 psf (299 Pa). After the panel was tested for water penetration at 2.86 psf, the test panel was then subjected to a pressure of 6.24 psf.

Following the 6.24 psf, 15 minute test, the differential pressure was increased from 6.24 psf to 12.0 psf for the same panel.

Condition of Acceptance: There shall be no visible water penetration at sheathing joints, as viewed from the back of the panel.

Conclusion: There was no visible water penetration at sheathing joints or any other location, as viewed from the back of the panel, during or at the end of the 15 minute, 2.86 psf test and at the end of the two additional tests (15 minute at 6.24 psf & 15 minute at 12.0 psf) in the panel tested. LATICRETE® Hydro Ban® with LATICRETE® Waterproofing Anti-Fracture Fabric applied to 1/2" DensGlass Gold Sheathing fastened to a lumber frame complied with the Structural, Racking, Restrained Environmental Conditioning, and Water Penetration Test requirements in accordance with Section 4.7 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

11.0 Weathering Tests per AC212

Sample Preparation: Samples were prepared in accordance with Section 4.8 of AC212 under the supervision of RADCO on the week of March 11, 2011.

Two (2) 4 inch (102 mm) by 8 inch (203 mm) pieces of each substrate were used for each sample. A 1/4 inch (6.4 mm) tile spacer was used to maintain a joint between the two pieces. The water resistive coating and joint tape was applied as described in section 4.0. A total of five (5) 8" x 8" (203 mm x 203 mm) specimens for each substrate were prepared as shown in the attached detail.

The sides of each specimen were sealed with General Electric 100% silicone rubber sealant before testing. There was no sealant applied to the back of the specimen. The tests were conducted in accordance with section 4.8 of ICC ES AC212.

11.1 Ultraviolet Exposure

Test Setup, Procedure & Results

The Ultraviolet aging was conducted in a UV chamber built in accordance with ICC ES AC 212. All specimens were subjected to UV exposure with the test specimens facing the UV bulbs. Four 300 watt UV light bulbs were set in a rectangular arrangement with the surface of the samples 2 ft. (610 mm) from the face of the UV light bulbs. The bulbs provided UV characteristics of 5.0 W/m²/nm irradiance at a wavelength of 315 to 400nm at 1 meter.

The specimens were subjected to twenty-one (21) UV cycles consisting of the following procedure:

UV exposure at 135 to 140 °F (57 to 60 °C) for 10 hours per day followed by conditioning at room temperature for 14 hours for a 24-hour cycle.

Total UV exposure time was 210 hours at 10 hours per day for 21 days.

The test was conducted from April 19, 2011 to May 9, 2011. The specimens were examined at the end of the UV exposure to ensure there was no cracking of the coating or bond failure between the coating and the substrate.

Observations: No specimen showed any signs of failure at the end of 21 days of UV exposure.

11.2 Accelerated Aging

Test Setup, Procedure & Results

At the conclusion of the UV exposure, the same five (5) specimens were subjected to twenty-five (25) accelerated aging cycles consisting of the following procedure:

1. Oven drying at 120 °F (49 °C) for 3 hours with all surfaces exposed.
2. Water immersion of the coating surface in room temperature water for 3 hours.
3. After removal from the water, specimens are blotted dry, then air-dried for 18 hours at 75 °F \pm 5 °F (23.8 °C \pm 2.8 °C) room temperature, with all surfaces exposed.

The test was conducted from May 17, 2011 to June 20, 2011.

Observations: The specimens were again examined at the end of the accelerated aging cycle and showed no signs of failure.

11.3 Hydrostatic Pressure Test, AATCC 127-1985

Test Setup, Procedure & Results

The Hydrostatic Pressure Test was conducted in accordance with AATCC Test Method 127-1998.

Alternate Test Setup and Apparatus

An alternate apparatus was utilized to conduct the tests. This alternate equipment was employed to take advantage of the time savings afforded by testing multiple specimens simultaneously. The design and operating theory were previously presented to ICC ES and IAS staff were found to be acceptable. This setup is equivalent to the Suter Hydrostatic Tester specified in AATCC 127-85. The test was conducted on each specimen that had previously been subjected to the UV and accelerated aging, with the top surface of the water resistive barrier in contact with water head. The test was conducted by raising the hydrostatic head to 55 cm (21.7") height and holding the hydrostatic pressure for 5 hours.

Condition of Acceptance: There shall be no cracking of the coating, or bond failure between the coating and the substrate. There shall be no water penetration on the plane of the exterior facing side of the substrate.

Specimen Substrate	No. of Specimens	Results
½" DensGlass Gold	5	Passed, no failure after 5 hours
½" Cement Backer Board	5	Passed, no failure after 5 hours

Conclusion: The Hydrostatic Pressure test on LATICRETE® Hydro Ban® applied to various substrates exceeded the minimum requirements of 55 cm for 5 hours with no signs of failure. The tests were conducted in June 2011. LATICRETE® Hydro Ban® applied to the substrates shown in the table above met all requirements for UV exposure, accelerated aging, and hydrostatic pressure test per Section 4.8 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.



12.0 Air Permeance Test Per ASTM E2178-03

Test Setup, Procedure & Results

Five (5) 24" x 24" specimens were tested in accordance with ASTM E2178-03 *Standard Test Method for Air Permeance of Building Materials*.

Sample Preparation: Samples were prepared by RADCO personnel on the week of May 28, 2011.

A two coat application of LATICRETE® Hydro Ban® was applied over the low-density fiberboard substrate described below with a 3/4" nap roller. Both coats were applied at 15 to 22 mils for a total of 20 to 30 mils dried thickness. Each coat was dry to the touch before the next coat was applied.

Substrate: 1/2-inch-thick (12.7 mm), low-density fiberboard substrate complying with ASTM C208 (Georgia-Pacific Stedi-R® Regular Fiberboard Sheathing). This fiberboard has a minimum air permeance of 1.0 L/s-m² (0.20 ft³/min-ft²). A pre-test evaluation of the fiberboard substrate by itself verified that it met the minimum air permeance requirements.

The test fixture consisted of a 34"x 34" air tight chamber into which the test specimen was placed. The test specimen was trimmed and sealed along the surface and edges such that the total area being evaluated was 24 inches (610 mm) square.

The differential static air pressure was achieved by evacuating the air inside the test chamber using a Minneapolis Duct Blaster- Series B vacuum pump. The airflow through the test specimen was measured in accordance with ASTM E2178.

Equipment

Minneapolis Duct Blaster- Series B vacuum pump
Minneapolis two channel pressure and fan flow gauge, model DG-700
Dwyer Air Flow meters
Dwyer Series 477A digital manometer
Omega (Monogram) multi-channel digital temperature gage
Dickson Digital Temperature and Humidity meter, TH300

Test Results

Ring Configuration:	No flow ring installed
Flow Conditioner installed:	Yes (required for depressurization test)
Air Temperature:	68 - 75 °F
Relative Humidity:	55 - 59%



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PRE-TEST SUBSTRATE EVALUATION		
Material Type	Air Infiltration	Air Exfiltration
1/2 inch thick Low-density fiberboard substrate	Greater than 1.0 L/s-m ² (0.20 ft ³ /min-ft. ²)	Greater than 1.0 L/s-m ² (0.20 ft ³ /min-ft. ²)

Condition of Acceptance: The air permeance shall be less than or equal to 0.02 L/s-m² at 75 Pa per AC212 section 3.10.

Test Results

Test Pressure (Pa)	Air Permeance at Standard Conditions (L/s-m ²)					
	Specimen Number					Average
	1	2	3	4	5	
25	0.00062	0.00000	0.00056	0.00093	0.00031	0.00048
50	0.00093	0.00019	0.00006	0.00093	0.00000	0.00042
75	0.00031	0.00031	0.00037	0.00124	0.00031	0.00051
100	0.00062	0.00031	0.00062	0.00186	0.00000	0.00068
150	0.00248	0.00062	0.00217	0.00310	0.00000	0.00167
300	0.00310	0.00000	0.00495	0.00372	0.00000	0.00235

Test Pressure (Pa)	Air Permeance at Standard Conditions After Re-measurement (L/s-m ²)					
	Specimen Number					Average
	1	2	3	4	5	
100	0.00062	0.00000	0.00217	0.00155	0.00000	0.00087
75	0.00031	0.00031	0.00043	0.00155	0.00000	0.00052
50	0.00062	0.00000	0.00037	0.00124	0.00000	0.00045

Conclusion: LATICRETE® Hydro Ban® complies with the air permeance requirements for an air barrier of Section 3.10 of the ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.



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13.0 CONCLUSION

LATICRETE® Hydro Ban® with LATICRETE® Waterproofing Anti-Fracture Fabric complied with all testing requirements in accordance with ICC ES *Acceptance Criteria for Water-Resistive Coatings used as Water-Resistive Barriers over Exterior Sheathing*, (AC212), Approved June 2011.

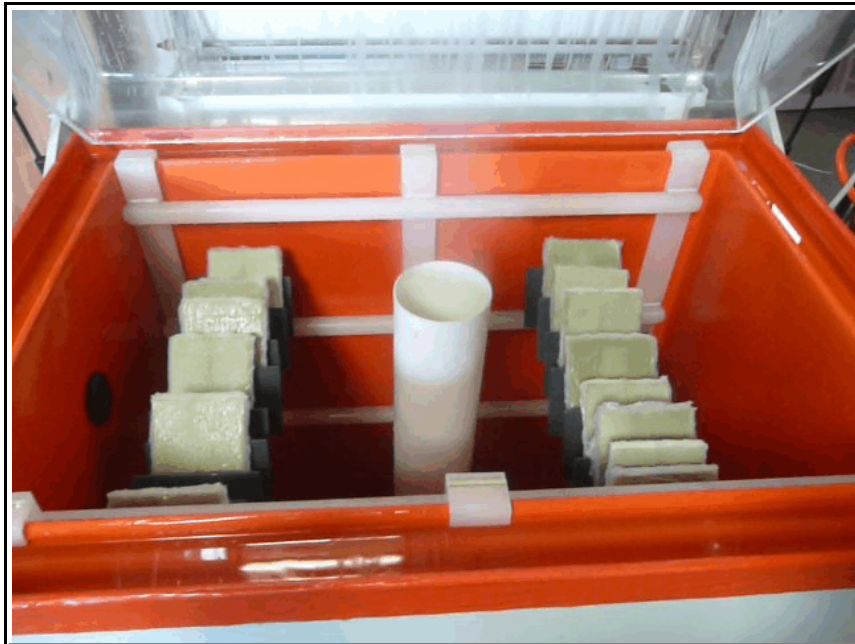
*****END OF REPORT*****

14.0 PHOTOGRAPHS

Sample Fabrication at RADCO



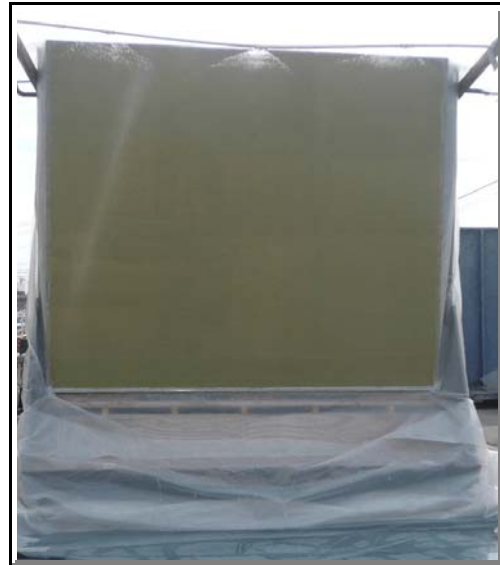
Water Resistance Test ASTM D2247



Racking Shear per ASTM E72



Water Spray-Restrained Environmental Cycling



Water Penetration per ASTM E331





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APPENDIX

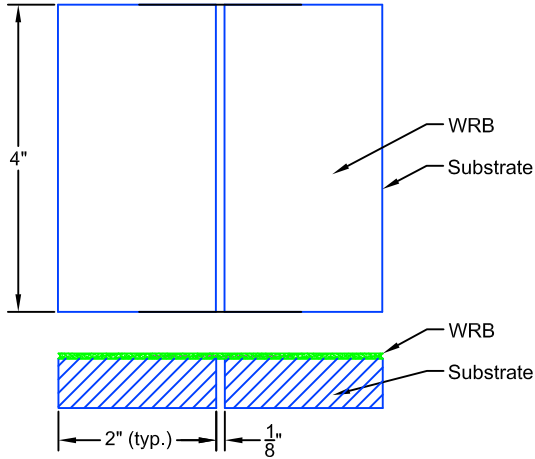
Test Specimen Drawings (2 pages)

Sampling Letter (1 page)

Product Description (4 pages)

Tensile Bond

Substrates
ASTM C297



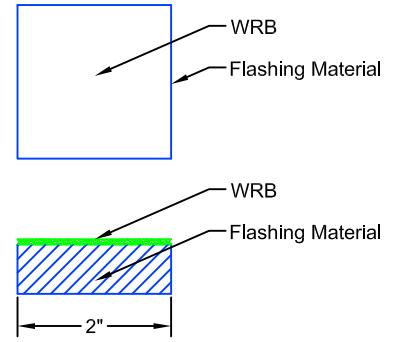
Sample Size 4"x4" QTY.=5

CUT LIST: [2"x4" - 16 pcs. per substrate]

- 1/2" Dens-Glass Gold
- 1/2" Cement Board

Tensile Bond

Flashing Material
ASTM C297



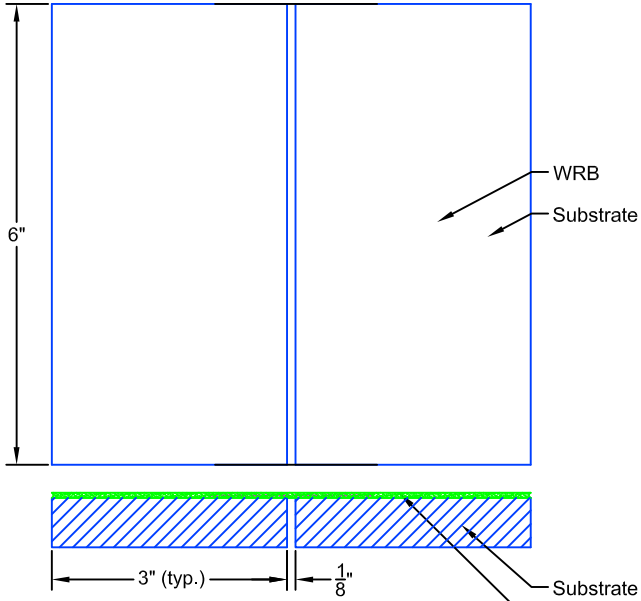
Sample Size 2"x2" QTY.=5

CUT LIST: [2"x2" - 8 pcs. per material]

- Rigid PVC
- Aluminum
- Painted Aluminum
- Galvanized Metal
- Copper

Freeze - Thaw

ICC ES AC212 (10 Cycles)



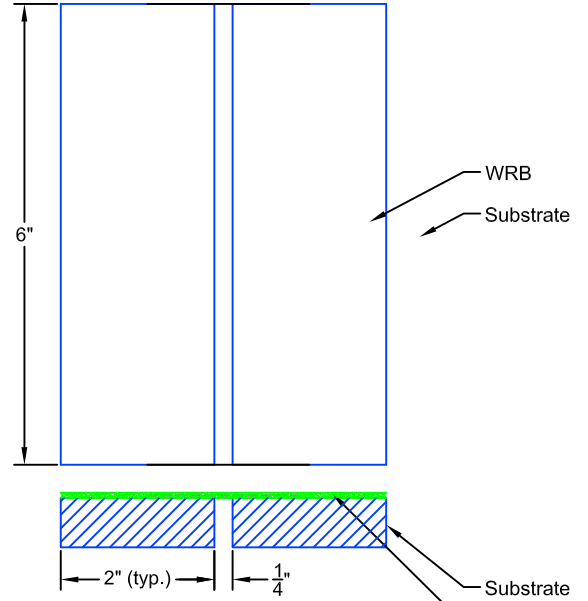
Sample Size 6"x6" QTY.=5

CUT LIST: [3"x6" - 16 pcs. per substrate]

- 1/2" Dens-Glass Gold
- 1/2" Cement Board

Water Resistance

ASTM D2247

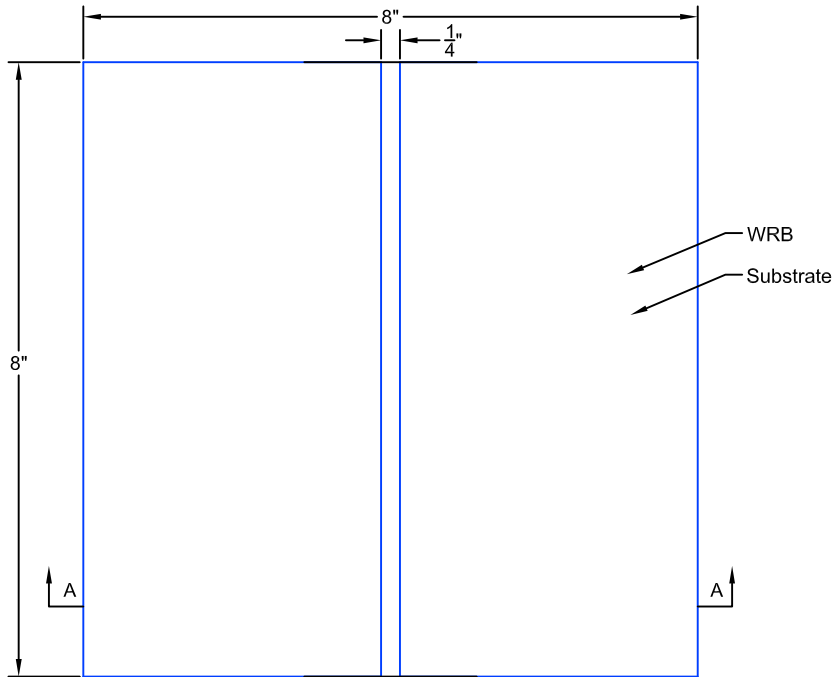


Sample Size 4"x6" QTY.=3

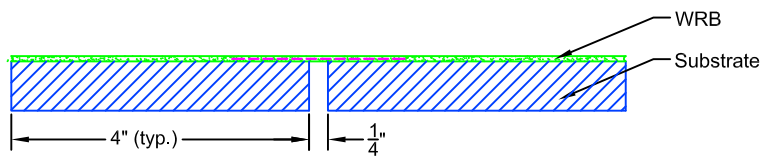
CUT LIST: [2"x6" - 12 pcs. per substrate]

- 1/2" Dens-Glass Gold
- 1/2" Cement Board

Weathering/ Ultraviolet Light Exposure & Hydrostatic Head



Section A-A



CUT LIST: [4"x8" - 16 pcs. per substrate]

$\frac{1}{2}$ " Dens-Glass Gold

$\frac{1}{2}$ " Cement Board



August 22, 2011

Mr. Jay Mishra
RADCO
3220 E 59th St.
Long Beach, CA 90805, USA

Subject: Test Sample Identification

Dear Mr. Mishra:

In accordance with the requirement of the ICC ES Acceptance Criteria For Test Reports (AC85), Approved December 2008 , Effective January 1, 2009, section 3.2, this declaration is being submitted by LATICRETE International Inc.

The identification of the samples submitted for testing is as follows:

LATICRETE Hydro Ban® Item # 9255-0005-2

Lot Number: 387083-00

Date of Manufacture: 1/11/2011

Place of Manufacture: LATICRETE International, Inc., One LATICRETE Park north, Bethany, CT 06524-3423

LATICRETE International, Inc. is certifying that the product identified above, and submitted to RADCO for testing is representative of the standard manufactured product to be covered in the evaluation report.

Please feel free to call if you have any questions.

Sincerely,

Jay B. Conrod

Jay B. Conrod
Product Manager

Innovative Tile and Stone Installation Systems



Hydro Ban™

DS-663.0-0711



1. PRODUCT NAME

LATICRETE® Hydro Ban™

2. MANUFACTURER

LATICRETE International, Inc.
1 LATICRETE Park North
Bethany, CT 06524-3423 USA

Telephone: +1.203.393.0010, ext. 235
Toll Free: 1.800.243.4788, ext. 235
Fax: +1.203.393.1684
Internet: www.laticrete.com

3. PRODUCT DESCRIPTION

LATICRETE Hydro Ban is a thin, load bearing waterproofing/crack isolation membrane that DOES NOT require the use of fabric in the field, coves or corners. LATICRETE Hydro Ban is a single component self curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane. LATICRETE Hydro Ban bonds directly to a wide variety of substrates.

Uses

- Interior and exterior.
- Swimming pools, fountains and water features.
- Shower pans, stalls and tub surrounds.
- Industrial, commercial and residential bathrooms and laundries.
- Spas and hot tubs.
- Kitchens and food processing areas.
- Terraces and balconies over unoccupied spaces.
- Countertops and facades.
- Steam rooms (when used in conjunction with a vapor barrier).

Advantages

- Allow for flood testing in 2 hours at 70°F (21°C) or higher †
- Does not require the use of fabric.*
- Bonds directly to metal and PVC plumbing fixtures only.
- Thin; only 0.020–0.030" (0.5–0.8 mm) thick when cured.
- Changes in color from a light sage to an olive green when cured.

- Anti-fracture protection of up to 1/8" (3 mm) over shrinkage and other non-structural cracks.
- "Extra Heavy Service" rating per TCNA performance levels (RE: ASTM C627 Robinson Floor Test).
- Exceeds ANSI A118.10 and A118.12.
- IAPMO approved.
- Contains Microban® antimicrobial product protection.
- Rapid drying for a faster time to tile.
- Lighter color for ease of inspection.
- Safe—no solvents and non-flammable.
- Install tile, brick and stone directly onto membrane.

* For gaps 1/8" (3 mm) or less see DS 663.5 for complete instructions

† Refer to cautions section for more information on curing

Suitable Substrates

- Concrete
- Concrete & brick masonry
- Cement mortar beds
- Cement plaster
- Gypsum wallboard*
- Exterior glue plywood*
- Ceramic tile & stone**
- Cement terrazzo**
- Cement backer board***
- Poured Gypsum Underlayment †

* Interior applications only.

** If skim coated with a LATICRETE® Latex Thin-Set Mortar.

*** Consult cement backer board manufacturer for specific installation recommendations and to verify acceptability for exterior use.

† Interior use only. Follow TCNA Guidelines/ Methods: F200, RH111, RH122, F180

Packaging

Commercial Unit: 5 gal (18.9 l) pail liquid (36 commercial units/pallet)
Mini Unit: 4 x 1 gal (3.8 l) pails of liquid packed in a carton (30 cartons/pallet)

Approximate Coverage

Commercial Unit: 250 ft² (23.2 m²)
Mini Unit: 50 ft² (4.6 m²)

Shelf Life

Factory sealed containers of this product are guaranteed to be of first quality for two (2) years* if stored at temperatures >32°F (0°C) and <110°F (43°C).

Limitations

- DO NOT bond to OSB, particle board, luan, Masonite® or hardwood surfaces.
- Adhesives/mastics, mortars and grouts for ceramic tile, pavers, brick and stone are not replacements for waterproofing membranes. When a waterproofing membrane is required, use LATICRETE Hydro Ban.

- **Note:** Surfaces must be structurally sound, stable and rigid enough to support ceramic/stone tile, thin brick and similar finishes. Substrate deflection under all live, dead and impact loads, including concentrated loads, must not exceed L/360 for thin bed ceramic tile/brick installations or L/480 for thin bed stone installations where L=span length.
- Do not use as a primary roofing membrane over occupied space.
- Do not use over dynamic expansion joints, structural cracks or cracks with vertical differential movement (See LATICRETE® Hydro Ban™ Installation Instructions, DS 663.5, for complete instructions).
- Do not use over cracks >1/8" (3 mm) in width.
- Do not use as a vapor barrier (especially in steam rooms).
- Do not expose unprotected membrane to sun or weather for more than 30 days.
- Do not expose to negative hydrostatic pressure, excessive vapor transmission, rubber solvents or ketones.
- Must be covered with ceramic tile, stone, brick, concrete, screeds, terrazzo or other traffic-bearing finish. Use protection board for temporary cover.
- Obtain approval by local building code authority before using product in shower pan applications.
- Do not install directly over single layer wood floors, plywood tubs/showers/fountains or similar constructs.

Cautions

Consult MSDS for more safety information.

- Allow membrane to cure fully (typically 24 hours at 50°F–69°F (10°C–21°C) and 70% RH and 2 hours at 70°F (21°C) or higher and 50% RH before flood testing); flood test prior to applying tile or stone.
- Maximum amount of moisture in the concrete/mortar bed substrate should not exceed 5 lbs/1,000 ft² (283 µg/s m²)/24 hrs per ASTM F-1869 or 75% relative humidity as measured with moisture probes.
- During cold weather, protect finished work from traffic until fully cured.
- For white and light-colored marbles, use a white LATICRETE Latex Portland Cement Thin Set Mortar.
- For green and moisture sensitive marble, agglomerates and resin backed tile and stone use LATAPOXY® 300 Adhesive (refer to Data Sheet 633.0).
- Wet coat thickness is 0.015 to 0.022" (0.4 to 0.6 mm) per coat. Use a wet film thickness gauge to check thickness.
- Allow wet mortars/plasters (wall mud consistency) to cure for 72 hours at 70°F (21°C) prior to installing LATICRETE Hydro Ban. Allow the LATICRETE Hydro Ban a minimum 2 hours cure at 70°F (21°C) prior to flood testing in these conditions.
- Protect from exposure to traffic or water until fully cured.
- The LATICRETE Hydro Ban will go from a light sage green to a darker olive green when fully cured. The second coat should not be applied until the first coat is fully cured. All flood test times should be after the second coat is fully cured with no light sage areas showing.

4. TECHNICAL DATA

Approval

- ICC Evaluation Service Report ESR-2417
- IAPMO/Uniform Plumbing Code File No.3524
- Los Angeles Board of Building and Safety Commissioners File Number: M-070162

- City of Philadelphia Plumbing Advisory Board Case Number: 4624
- City of Tampa Construction Services Division

VOC/LEED Product Information



This product has been GREENGUARD Indoor Air Quality Certified® by the GREENGUARD Environmental Institute under the GREENGUARD Standard for Low Emitting Products in finished form.

Applicable Standard

ANSI A118.10 and A118.12

Physical Properties

Physical Property	Test Method	LATICRETE® Hydro Ban™
7-day Hydrostatic Test	ANSI A118.10	Pass
7-day Tensile Strength	ANSI A118.10	265–300 psi (1.8–2.0 MPa)
7-day Water Immersion	ANSI A118.10	95–120 psi (0.7–0.83 MPa)
7-day Shear Bond	ANSI A118.10	200–275 psi (1.4–1.9 MPa)
28-day Shear Strength	ANSI A118.10	214–343 psi (1.5–2.3 MPa)
System Crack Resistance Test	ANSI A118.12.5.4	Pass (High)
Water Vapor Transmission	ASTM E 96–00 ^{E1} Procedure B	0.515 grains/h • ft ² (0.3602 g/h • m ²)
Water Vapor Permeance	ASTM E 96–00 ^{E1} Procedure B	1.247 perms 71.21 (ng/Pa • s • m ²)
System Performance	ANSI A118.10; ASTM C627; TCA Rating	cycles 1–14 "Extra Heavy"
Potability of Water Applicable to Waterproofing Systems	NBR 12170:2009 (Technical Norm from Brazil)	Pass
Tensile Strength for Elongation		250%
Thickness (dried)		20–30 mils (0.5–0.8 mm)

Time to Tile

Substrate	Time to Tile (min.)*
Concrete	50
Cement Board	30
Fiber Cement Underlayment	15

*After second coat is applied at 70°F (21°C) and 50% RH. The time to tile will vary depending on substrate, temperature and relative humidity.

Working Properties

LATICRETE Hydro Ban can be applied using a paint brush, roller or trowel. All areas must have two coats to ensure waterproofing capabilities. When using a paint roller, substrate will not show through LATICRETE Hydro Ban if coated with 0.020–0.030" (0.5–0.8 mm) of dried membrane. Color changes from a light sage to olive green when fully cured.

5. INSTALLATION

Surface Preparation

Surface temperature must be 50–90°F (10–32°C) during application and for 24 hours after installation. All substrates must be structurally sound, clean and free of dirt, oil, grease, paint, laitance, efflorescence, concrete sealers or curing compounds. Make rough or uneven concrete smooth to a wood float or better finish with a LATICRETE underlayment. Do not level with gypsum or asphalt based products. Maximum deviation in plane must not exceed 1/4" in 10 ft (6 mm in 3 m) with no more than 1/16" in 1 ft (1.5 mm in 0.3 m) variation between high spots. Dampen hot, dry surfaces and sweep off excess water—installation may be made on a damp surface. New concrete slabs shall be damp cured and a minimum of 14 days old before application.

1. Installer must verify that deflection under all live, dead and impact loads of interior plywood floors does not exceed industry standards of L/360 for ceramic tile and brick or L/480 for stone installations where L=span length.

2. Minimum construction for interior plywood floors.

SUBFLOOR: 5/8" (15 mm) thick exterior glue plywood, either plain with all sheet edges blocked or tongue and groove, over bridged joints spaced 16" (400 mm) o.c. maximum; fasten plywood 6" (150 mm) o.c. along sheet ends and 8" (200 mm) o.c. along intermediate supports with 8d ring-shank, coated or hot dip galvanized nails (or screws); allow 1/8" (3 mm) between sheet ends and 1/4" (6 mm) between sheets edges; all sheet ends must be supported by a framing member; glue sheets to joints with construction adhesive.

UNDERLAYMENT: 5/8" (15 mm) thick exterior glue plywood fastened 6" (150 mm) o.c. along sheet ends and 8" (200 mm) o.c. in the panel field (both directions) with 8d ring-shank, coated or hot dip galvanized nails (or screws); allow 1/8" (3 mm) to 1/4" (6 mm) between sheets and 1/4" (6 mm) between sheet edges and any abutting surfaces; offset underlayment joints from joints in subfloor and stagger joints between sheet ends; glue underlayment to subfloor with construction adhesive. Refer to Technical Data Sheet 152 "Bonding Ceramic Tile, Stone or Brick Over Wood Floors" for complete details.

Pre-Treat Cracks & Joints

Fill all substrate cracks, cold joints, and control joints to a smooth finish using a LATICRETE® Latex Fortified Thin-Set. Alternatively, a liberal coat^{^^} of LATICRETE Hydro Ban™ applied with a paint brush or trowel may be used to fill in non structural joints and cracks. Apply a liberal coat^{^^} of LATICRETE Hydro Ban approximately 8" (200 mm) wide over substrate cracks, cold joints, and control joints using a paint brush or roller (heavy napped roller cover). LATICRETE 6" (150 mm) reinforcing fabric can be used to pretreat cracks, joints, curves, corners, drains and penetrations with LATICRETE Hydro Ban.

Pre-Treat Coves and Floor/Wall Transitions

Fill all substrate coves and floor/wall transitions to a smooth finish and changes in plane using a LATICRETE latex fortified thin-set mortar. Alternatively, a liberal coat^{^^} of LATICRETE Hydro Ban applied with a paint brush or trowel may be used to fill in cove joints and floor/wall transitions <1/8" (3 mm). Apply a liberal coat^{^^} of LATICRETE Hydro Ban approximately 8" (200 mm) wide over substrate coves and floor/wall transitions using a paint brush or roller (heavy napped roller cover).

Pre-Treat Drains

Drains must be of the clamping ring type, with weepers and as per ASME A112.6.3. Apply a liberal coat^{^^} of LATICRETE Hydro Ban Waterproofing Membrane liquid around and over the bottom half of drain clamping ring. Cover with a second coat^{^^} of LATICRETE Hydro Ban. When dry, apply a LATICRETE Latasil™ bead where the LATICRETE Hydro Ban meets the drain throat. Install top half of drain clamping ring.

Pre-Treat Penetrations

Allow for a minimum 1/8" (3 mm) space between drains, pipes, lights or other penetrations and surrounding ceramic tile, stone or brick. Pack any gaps around pipes, lights or other penetrations with a LATICRETE Latex fortified thin-set mortar. Apply a liberal coat^{^^} of LATICRETE Hydro Ban liquid around penetration opening. Cover with a second coat^{^^} of LATICRETE Hydro Ban. Bring LATICRETE Hydro Ban up to level of tile or stone. When dry, seal flashing with LATICRETE Latasil.

Main Application

Allow any pre-treated areas to dry to the touch. Apply a liberal coat^{^^} of LATICRETE Hydro Ban with brush or roller over substrate including pre-treated areas. Apply another liberal coat^{^^} of LATICRETE Hydro Ban over the first coat of LATICRETE Hydro Ban. Let topcoat dry to the touch, approximately 1–2 hours at 70°F (21°C) and 50% RH. When last coat has dried to the touch, inspect final

surface for pinholes, voids, thin spots or other defects. LATICRETE Hydro Ban will dry to an olive green color when it's dry to touch. Use additional LATICRETE Hydro Ban to seal defects.

Expansion Joints

See LATICRETE Hydro Ban Installation Instructions 663.5.

Note: Apply a liberal coat^{^^} of LATICRETE Hydro Ban, approximately 8" (200 mm) wide over the areas. Then embed and loop the 6" (150 mm) wide LATICRETE Waterproofing Membrane Reinforcing Fabric and allow to bleed through. Then top coat with a second coat^{^^} of LATICRETE Hydro Ban.

Protection

Provide protection for newly installed membrane, even if covered with a thin bed ceramic tile, stone or brick installation, against exposure to rain or other water for a minimum of 2 hours at 70°F (21°C) and 50% RH.

Flood Testing

Allow membrane to cure fully before flood testing, typically 2 hours after final cure at 70°F (21°C) and 50% RH. Cold and/or wet conditions will require a longer curing time. For temperatures 50–69°F (10–21°C) allow 24 hours after final cure prior to flood testing.

Installing Finishes

Once LATICRETE Hydro Ban has dried to the touch, ceramic tile, stone or brick may be installed by the thin bed method with a LATICRETE Latex Thin-Set Mortar. Allow LATICRETE Hydro Ban to cure 2 hours at 70°F (21°C) and 50% RH before covering with concrete, thick bed mortar, screeds, toppings, coatings, epoxy adhesives, terrazzo or moisture sensitive resilient or wood flooring. Do not use solvent-based adhesives directly on LATICRETE Hydro Ban.

Drains & Penetrations

Use LATICRETE Latasil and foam backer rod to seal space between drain or penetration and finish. Do not use a grout or joint filler mortar.

Control Joints

Ceramic tile, stone and brick installations must include sealant-filled joints over any control joints in the substrate. However, the sealant-filled joints can be offset horizontally by as much as one tile width from the substrate control joint location to coincide with the grout joint pattern.

Expansion Joints

Ceramic tile, stone and brick installations must include expansion at coves, corners, other changes in substrate plane and over any expansion joints in the substrate. Expansion joints in ceramic tile, stone or brickwork are also required at perimeters, at restraining surfaces, at penetrations and at the intervals described in the Tile Council of North America, Inc. (TCNA) Handbook Installation Method EJ171. Use LATICRETE Latasil and backer rod.

Spray Application of LATICRETE Hydro Ban

Follow all installation and surface preparation requirements outlined in this document and DS 663.5 and TDS 410.

The sprayer being used for the application of LATICRETE Hydro Ban should be capable of producing a maximum of 3300 psi (22.8 MPa) with a flow rate of 0.95 to 1.6 GPM (3.6 to 6.0 LPM) using a 0.521 or a 0.631 reversible tip. Keep the unit filled with LATICRETE Hydro Ban to ensure continuous application of liquid. The hose length should not exceed 100' (30 m) in length and 3/8" (9 mm) in diameter.

Apply a continuous LATICRETE Hydro Ban film with an overlapping spray^{^^}. The wet film has a sage green appearance and dries to a darker olive green color. When the first coat has dried to a uniform olive green color, approximately 45 to 90 minutes at 70°F (21°C), visually inspect the coating for any voids or pinholes. Fill any defects with additional material and apply the second coat^{^^} at right angles to the first. The wet film thickness should be checked periodically

^{^^} Wet coat thickness is 15–22 mils (0.4–0.6 mm) consumption per coat is ~0.01 gal/ft² (~0.4 t/m²); coverage per coat is ~100 ft²/gal (~2.5 m²/l). Use wet film gauge to check thickness.

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using a wet film gauge. Each wet coat should be 0.015–0.022 inches (0.4–0.6 mm) thick. The combined dried coating should be 0.020–0.030 inches (0.5–0.8 mm) thick.

Check application thickness with a wet film gauge periodically as the LATICRETE® Hydro Ban™ is being dispensed to ensure that the appropriate thickness and coverage is achieved. Bounce back and overspray will consume more product. To achieve the required film thickness, the coating must be free from pinholes and air bubbles. Do not back roll the spray applied coating. Allow the LATICRETE Hydro Ban to cure in accord with the instructions in this document, DS 663.5 and TDS 410 prior to the installation of the tile or stone finish.

It is important to note that areas not scheduled to receive the LATICRETE Hydro Ban should be taped off and protected from any potential overspray. Expansion and movement joints should be honored and treated as outlined in this document, DS 663.5 and TDS 410.

Cleaning

While wet, LATICRETE Hydro Ban can be washed from tools with water.

6. AVAILABILITY AND COST

Availability

LATICRETE and LATAPOXY® materials are available worldwide.

For Distributor information, call:

Toll Free: 1.800.243.4788, ext. 235

Telephone: +1.203.393.0010

For on-line Distributor Information, visit LATICRETE at www.laticrete.com.

Cost

Contact a LATICRETE Distributor in your area.

7. WARRANTY

See 10. FILING SYSTEM.

DS 230.13: LATICRETE Product Warranty

A component of:

DS 230.05: LATICRETE 5 Year System Warranty

DS 230.15APD: LATICRETE 15 Year System Warranty – APD
For Steel or Wood Framed Exterior Facades

DS 230.15SPD: LATICRETE 15 Year System Warranty – SPD
For Steel or Wood Framed Exterior Facades

DS 025.0APD: LATICRETE 25 Year System Warranty – APD

DS 025.0SPD: LATICRETE 25 Year System Warranty – SPD

DS 230.99: LATICRETE Lifetime System Warranty

8. MAINTENANCE

LATICRETE and LATAPOXY grouts require routine cleaning with a neutral pH soap and water. All other LATICRETE and LATAPOXY materials require no maintenance but installation performance and durability may depend on properly maintaining products supplied by other manufacturers.

9. TECHNICAL SERVICES

Technical assistance

Information is available by calling the LATICRETE Technical Service Hotline (hours 8:00 AM to 5:30 PM EST):

Toll Free: 1.800.243.4788, ext. 235

Telephone: +1.203.393.0010, ext. 235

Fax: +1.203.393.1948

Technical and safety literature

To acquire technical and safety literature, please visit our website at www.laticrete.com.

10. FILING SYSTEM

Additional product information is available on our website at www.laticrete.com. The following is a list of related documents:

DS 230.13:	LATICRETE Product Warranty
DS 230.05:	LATICRETE 5 Year System Warranty
DS 230.15APD:	LATICRETE 15 Year System Warranty – APD For Steel or Wood Framed Exterior Facades
DS 230.15SPD:	LATICRETE 15 Year System Warranty – SPD For Steel or Wood Framed Exterior Facades
DS 025.0APD:	LATICRETE 25 Year System Warranty – APD
DS 025.0SPD:	LATICRETE 25 Year System Warranty – SPD
DS 230.99:	LATICRETE Lifetime System Warranty
DS 297.0:	LATICRETE 220 Marble & Granite Mortar
DS 6200.1:	LATICRETE Latasil™
DS 633.0:	LATAPOXY 300 Adhesive
TDS 152:	“Bonding Ceramic Tile, Stone or Brick Over Wood Floors”
TDS 410:	Spraying LATICRETE Hydro Ban
DS 663.5:	LATICRETE Hydro Ban Installation Instructions

LATICRETE International, Inc.

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