

# *BLOCKTITE SYSTEM*

## *WATER-REPELLENT ADMIXTURE*

### *CERTIFICATION PROGRAM*

- Mix Performance Worksheet
- Testing Procedures/Protocol
- Test Results, Calculations
- Certificate of Compliance



**EUCLID CHEMICAL**

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## Water Repellent Certification Program

The Euclid Chemical Company has developed a water repellent certification program for block producers using *EUCON BLOCKTITE* and/or *HYDRAPEL* admixtures. After successful evaluation, a producer is authorized to manufacture water repellent-specified concrete masonry units using Euclid Chemical admixtures. Dosage rates are established by mix design and production plant using established ASTM and NCMA-developed test methods. The producer is advised by Euclid Chemical to periodically test water repellent production by spot-checking puddle retention and/or spray-bar performance. Your Euclid Chemical sales representative should be notified when significant changes in materials, mix design, or manufacturing equipment has occurred. Verification can be facilitated by the local salesman or by the masonry market segment manager for Euclid Chemical. Below is an outline of our evaluation procedures.

**Step 1:** It is recommended that mix design data is obtained and reviewed for possible anomalies prior to conducting plant evaluations. Further mix design and/or machine adjustments may be required to achieve desired performance. **If a chemically similar, competitive water repellent admixture (from a manufacturer other than Euclid Chemical) is currently being used without incident, substituting it with *EUCON BLOCKTITE* (at an equal dosage rate), is acceptable providing that comparable performance is observed.**

**Step 2:** At least two different dosages (per mix design) will be evaluated by a Euclid Chemical sales or technical specialist to determine optimal loading rate. Physical appearance, block weight, and machine response will be monitored. A set of 6 test block per mix will be marked with spray paint (for mix identification), and cured as normal before isolating for pick-up. All pertinent data will be collected and included in a final report.

**Step 3:** Water repellency can be evaluated on-site (using standardized equipment and procedures) or sent to The Euclid Chemical Company technical center in Cleveland, Ohio. Euclid sales representatives can conduct field re-certification if mix design or process changes have occurred, or when the initial certification period has expired.

## ***Method 1***

***Water Bead/Puddle Retention Test:*** This test measures a) the ability to demonstrate surface repellency, and b) the length of time that water beads remain on the surface before evaporating or being absorbed. This simple lab and field test is highly recommended for prequalifying experimental production runs, and for periodic checks on water repellent performance.



***Method:*** - Three full-sized masonry units are tested from each test mix submitted. Units shall have no dust or visible moisture on the surface.

- Place unit in a container with about 8-10 lbs of dry sand at the bottom. Place the block with face shells directed *upward* in the container. Level using a torpedo level.
- Place 4ml of potable water at 5 discrete locations per block. Observe closely for the first minute and record if water is absorbed during this initial stage. Make additional recordings at 15 minutes, 30 minutes, 1 hour, 2 hours, and 4 hours.

Performance criteria established by NCMA are as follows:

<b>Time Scale</b>	<b>Excellent</b>	<b>Good</b>	<b>Marginal</b>	<b>Poor</b>
4 Hours	15 drops remaining	10-15 drops remaining	5-10 drops remaining	0-5 drops remaining

If a marginal rating results, The Euclid Chemical Company will recommend adjustments to the mix design, aggregate blend, and/or dosage rate of *EUCON BLOCKTITE* or *HYDRAPEL* before retesting.

## ***Method 2***

***Water Uptake of Concrete Masonry Units:*** This is a test that has been modified from ASTM C 1403 “Standard Test Method for Rate of Water Absorption of Mortar” to accommodate the testing of concrete masonry units. Three full size CMU or three face shell specimens, saw-cut from three full sized units are required per test mix. The purpose of this test is to measure the capillary absorption of the production samples.



***Method:*** - Prepare the sample by saw cutting the face shell from CMU keeping the web “tabs” as short as possible without damaging the back of the face shell.

- Measure dimensions (height, width, length) in accordance with ASTM C-140.
- Dry the specimens in a ventilated oven at 60°C for a minimum of 24 hours and until the weight change is not greater than 0.2% over a one-hour period.
- Allow test specimens to cool (at room temperature) for a minimum of 2 hours or until ambient temperature is reached.
- Begin the testing within 24 hours after reaching temperature equilibrium.

***Prepare an immersion container that will minimize evaporation with an airtight seal.***

- Use specimen supports that do not cover more than ten percent of the surface area and which do not rust, expand or shrink as a result of exposure to water.
- Water should be 75° (+/- 15°) and filled to 0.12 (+/- .02) inches above the specimen supports when the samples are added.
- Record the weight of each specimen as  $W_0$  to the nearest 0.01 lb.
- Immediately place the specimen into immersion tank with the smooth, machined face in contact with the specimen supports.
- Cover the tank to minimize evaporation.

***Take readings at 15 minutes, then at 1, 2, 4, and 24 hours by removing specimen from immersion tank and blotting the surface with a damp cloth prior to weighing (using the ASTM C 140 method). Do not blot excessively; complete specimen weighing within 1 minute.***

- Record each weight as  $W_t$  where T is the time in hours since starting the test.
- After weighing, return the specimen to immersion tank.
- Adjust water to maintain depth of 0.12 inches above the specimen supports.
- Cover immersion tank to minimize evaporation.

***Determine the total absorption of each specimen.***

- Immediately after the 24-hour reading, place the specimen in an absorption tank so that it is fully submerged (per ASTM C 140).
- Soak for 24 hours and determine immersed weight ( $W_i$ ) and saturated ( $W_s$ ) according ASTM C 140, except that when determining  $W_s$  the specimen should be blotted with a dampened cloth within 10 seconds of removal from tank, and weighed within 1 minute.

***Calculations and Report***

- Qualified (NCMA-certified) laboratory personnel who conduct such tests should also calculate the results. Testing may be conducted locally at an accredited laboratory, or samples can be transported to Euclid Chemical. Mathematical formulas are available from your Euclid Chemical representative.

**Euclid Chemical will accept up to 60% relative (of total saturation) absorption as being considered water repellent. Mix design and admixture dosage adjustments will be recommended before another attempt for certification is allowed.**

## ***Method 3***

***Spray Bar Test for Concrete Masonry Units:*** One full sized specimen will be required from each trial mix. This test can be conducted on smooth, polished, ground, split and/or ribbed face shells. The purpose of this test is to determine water penetration resistance (from both active spray and capillary wicking) when exposed to simulated rainfall.



***Method:*** - Prior to testing, store units in laboratory air (24+/- 8°C [75+/- 15°F]) with a relative humidity of less than 80% for not less than 48 hours. Units shall have no visible moisture prior to start of testing.

### ***Standard test kit:***

- ***Container:*** A suitable size plastic container having sufficient room to place a small pump and to restrict water from splashing outside of it.
- ***Spray Bar:*** A ½ inch diameter PVC pipe which is 1 inch shorter than the test unit, with a PVC T section in the middle and sealed on both ends and having 1/8 inch diameter holes spaced 1 inch apart.
- ***Connection Pipes:*** Required quantity of ½ inch diameter pipe and flexible vinyl hose with necessary fittings, such as PVC T section, elbow, and hose clamp to connect the spray bar into the submersible pump.
- ***Pump:*** A submersible pump having a constant discharge of 2 gallons per minute throughout the testing period of 24 hours.
- ***Bricks or pavers:*** 2 bricks or pavers for supporting the block assemblage above the surface of the water in the test container.
- ***Aluminum angle & rubber sheet:*** Required quantity of ½ inch angle and rubber sheets to prevent water splash into the test unit.

### ***Test Assembly:***

- Place 2 bricks or pavers on edge in the test container so as to support the assemblage above the anticipated water level (3-4 inches) in the container.
- Aluminum angle and rubber strip may be glued to the sides and bottom face of the unit to prevent water splashing, cascading down the face and curling around the bottom edge of the unit.
- Place spray bar on top of the assemblage so that the spray bar is about 1 inch from face and about 1 inch down from the top of the CMU. Face the holes to the test surface in such a way that water is impacting the face about ½ inch down from spray bar holes, about 1.5 inches from the top edge of the units and having an average angle of incidence of water spray equal to 30 degrees from horizontal.
- Fill water in to the container to about 1 inch below the lower edge of the unit.
- After putting water into the container, assemble the spray bar connecting in to the submersible pump with the flexible vinyl hose.
- Repeat for remaining specimens (each specimen will have its own container.)

### ***Test Procedure:***

- Plug in pump motor and allow the spraying action to wet the face of the assemblage with continual spraying for 24 hours.
- Record the dampness on the opposite side of the test face (inside core) of the unit at 15 minutes, 30 minutes, 1 hour, 1.5 hours, 2 hours, 3 hours, 8 hours, and 24 hours.
- Record other observations.

### ***Reporting:***

Water penetration via pinholes (vs. capillary wetting) will be documented separately as they do not necessarily reflect the water repellency of a masonry unit. This is only one of three tests that, when combined with the water droplet and water uptake procedures, characterize the overall water repellency of Blocktite and/or Hydrapel-treated CMUs. There are however, limitations to the extent allowable.

## RESULTS SUMMARY

Date: \_\_\_\_\_ Producer: \_\_\_\_\_

Location: \_\_\_\_\_

Mix ID: \_\_\_\_\_ Admixture: \_\_\_\_\_

Dosage: \_\_\_\_\_

Representative: \_\_\_\_\_

Water Droplet Test: \_\_\_\_\_ pass \_\_\_\_\_ fail \_\_\_\_\_

Water Uptake Test: \_\_\_\_\_ pass \_\_\_\_\_ fail \_\_\_\_\_

Spray Bar Test: \_\_\_\_\_ pass \_\_\_\_\_ fail \_\_\_\_\_

Technician: \_\_\_\_\_



Date:

Customer Name and Address:

Dear Valued Customer:

A Water Repellency Evaluation was conducted at your (location) manufacturing facility on (date). Laboratory testing included procedures outlined in Euclid Chemical's Water Repellency Certification Program. NCMA-certified laboratory technicians have performed ASTM C-140 "Methods of Sampling and Testing Concrete Masonry Units", The "Water Bead Test", "Water Uptake of Concrete Masonry Units", and the Spray Bar Test for Concrete Masonry Units". All tests were based on the recommendations of the Water Repellency Task Group as sponsored by the National Concrete Masonry Association. The following report details results of this testing. Based on these results, either a certificate of conformance will be issued or recommendations will be given to assist in achieving desired (passing) water repellent performance.

Mix identification and design:

ASTM C-140 test results: (Write Results)

Conclusions:

- 1.) Water Bead Test: (Write results)
- 2.) Water Uptake Test: (Write Results)
- 3.) Spray Bar Test for Concrete Masonry Units (write Results)
- 4.) Certification (granted or denied) for Mix ID # XXX