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Report of Tests

Subject

Water Penetration Study to Determine the Effectiveness of the BlockNet® by Mortar Net Solutions®. Used in Concrete Masonry Unit Wall Construction.

Project

Mortar Net Research Program

Test Methods:

- ASTM E 514, "Test Method for Water Penetration and Leakage Through Masonry"
- ASTM C 140, "Test Methods of Sampling and Testing Concrete Masonry Units"
- ASTM C 270, "Specification for Mortar for Unit Masonry"

Test Protocol

Within this study, one split-face concrete masonry unit wall was constructed and subjected to the test procedures outlined in ASTM E 514. A Type .S. mortar was proportioned and used together with 8" x 8" X 16" split-face medium weight concrete masonry units to construct the wall. A water drainage system produced by Mortar Net Solutions® was placed at the base of the second course of concrete masonry units (CMU).

Physical Properties Of Materials

Mortar (ASTM C 270 -Type "S")

Water Retention (%)	90.2
Air Entrainment (%)	4.3
Cone Penetrometer (mm)	51.0
Compressive Strength (PSI)	
7 days	1960
28 days	2435

CMU

Size	8x8x16"
Absorption (%)	6.2
Density (Lbs/cu.ft)	117.3
Compressive Strength (PSI @ 28 days)	2352.0

Wall Fabrication

One single wythe CMU wall for permeance testing was constructed according to ASTM E 514-90 requirements. The wall was built during a 24 hour period by an experienced lead mason. Workmanship was judged as to be average. Ambient temperature was maintained between 60°F and 75°F during the fabrication and subsequent curing period.

The wall was constructed by the mason and required approximately 1.5 hours to complete. The wall was constructed on an inverted steel channel, and the bottom course was laid on a bed of mortar. Full bedded mortar joints were used, and the wall was constructed one course at a time by applying mortar the full length of the bed joint, then buttering the ends of a CMU one at a time before setting on the bed joint. The joints were initially struck and tooled with a concave jointer after the top course was laid, and a final tooling was done approximately 30 to 60 minutes later.

The wall was cured according to ASTM E 514-90 which requires curing for 7 days enclosed in plastic sheeting and for a minimum of 7 days subsequent curing in laboratory air. The total curing time for the wall was 14 days.

Flashing was built into the wall to collect water that had passed completely through the wall. Water which leaked through the exposed face of the wall and passed through to the back of the wall was collected in the trough which was located between the first and second course.

BlockNet® by Mortar Net Solutions® was constructed between the first two courses of CMU to facilitate the removal of water which passed through the exterior face shell.

## Test Procedures

ASTM E 514-90 test procedures were followed throughout the test.

The ASTM E 514-90 test chamber was constructed of welded aluminum angle stock, and the observation face of the chamber was outfitted with Lexan sheet to allow full view into the chamber. All fixtures and appurtenances were in conformity with ASTM E 514-90, Section 4. The frame was outfitted with a monometer to measure interior pressure and a flow meter to monitor the amount of flow. During the testing, the frame was pressurized to 10 psf, and the water flow was adjusted to 40.8 gal/hr which is equal to 3.4 gal/ft<sup>2</sup>/hr. The unit was held in place with clamps, and a closed cell foam gasket material, and silicone caulking provided the proper tight seal.

Water was collected and measured at the front and back sides of the test wall.

## Test Results

Conditions

Test Time	4 Hours
Water Flow	0.68 gal/min
Air Pressure	2-inch water column

Sample Description: BlockNet® System by Morter Net Solutions®

	Front	Back
Time of appearance on back of wall (min.)	—	80
Time of appearance of visible water on back of wall (min)	—	n/a
Area of dampness of wall at the end of 4 hours (% of test area)	—	10
Total water collected in 4-hour period (liters)	5.75	0