



**CERAMIC TILE INSTITUTE OF AMERICA, INC.**  
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## **CTI REPORT 73-2-5 (R-85)**

**SUBJECT: Water Resistant and Waterproofing Papers**

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### **A. INTRODUCTION**

1. Most building codes stipulate that weather exposed surfaces and other areas subject to unusual amounts of moisture have a weather resistive barrier to protect the wall covering on the other side of the studs.

This is necessary because, contrary to popular belief, Portland cement plaster or mortar is not a total barrier to moisture migration. It has been said that Portland cement plaster or mortar will absorb moisture at the rate of about 1/8 inch per hour. In other words, one-inch of portland cement plaster exposed to eight hours of continual rain will be thoroughly wet. The only protection to moisture intrusion is an effective perforation-free membrane.

### **B. DISCUSSION**

1. While it is desirable to keep precipitation from penetrating the protective walls of a structure from the outside, it is just as important to allow gaseous moisture, or vapor, generated within a building as a result of cooking, washing, breathing, etc., to escape to the atmosphere outside.
2. For this reason, the weather barrier behind the lath in the walls of most residential structures will repel water, but allow vapor to pass through from the inside to out of doors.
3. Paper backed metal plaster reinforcement, expanded metal or welded or woven wire fabric laths are available in a variety of paper backings and each must be considered for its own merits. Following are the most commonly encountered paper backings:
  - a. **ABSORPTIVE PAPER.** It is not waterproofed with asphalt, but is sized for stiffness with rosin or starch. It is usually furnished as a backing on lath to facilitate machine application of the plaster or to provide additional suction on horizontal surfaces to reduce "drop outs".

- b. **WATER RESISTANT, VAPOR PERMEABLE.** In Federal Specification W-B-790 for Building Papers this is classified as a Type 1 (Barrier Paper) Grade "D" (Water vapor permeable). This is the paper backing most frequently found to be required for the weather barrier on a building. The codes generally stipulate that such paper be applied weatherboard fashion lapped not less than two inches (2") on horizontal joints and six inches (6") on vertical joints. When approved paper backed metal or wire fabric lath is used the lap at vertical edges need only be two inches (2").

A weather barrier can be omitted if the exterior covering is of approved weatherproof panels, when there is no human occupancy, or when the lath is installed over water repellent panel sheathing.

**WATERPROOF, VAPOR RESISTANT** - This would comply with Federal Specification VV-B790 Type 1, Grade "B" requirements. Paper backing of this type might be used in shower stalls, tub recesses, etc. The maximum permeability of Grade "B" paper; is 6 grams per square meter per 24 hours.

**POLYETHYLENE FILM** - Thick enough to block moisture yet thin enough to breathe and avoid vapor condensation problems 1 mil polyethylene film is receiving attention as a moisture barrier. It affords the advantage of not concealing the framing to which it is being applied. Available in rolls or as a backing, factory applied to some expanded metal laths.

Not totally accepted by all building codes because of susceptibility to damage from the ultra-violet rays of the sun.

#### **EDITORIAL NOTES**

1. This report was written to supply some technical information on waterproof and water resistant papers as used in the construction industry. The content is best considered with several other CTI Field Reports.
2. The following information on waterproof paper is from ANSI Standard Specification A108.1 for installation of tile in the mortar method.

**WATERPROOF CLEAVAGE MEMBRANE:** Cleavage membrane shall be any of the following materials at contractor's option:

1. Waterproof building felt conforming to USAS A109.2-1961 (ASTM D226-60), 15 lb. Asphalt-saturated or USAS A109.3-1956 (ASTM D227-56), 13 lb coal tar saturated.
2. Reinforced asphalt paper, duplex type conforming to Federal Specification UU-P-264.
3. Polyethylene sheeting at least nominal thickness of 0.004 inch and conforming to USAS A37.77-1966 (ASTM C156-65).

SAMPLES: Samples of material as designated in the project specification shall be submitted for approval before delivery to the project site. Installed materials shall match approved samples.

**STORAGE OF MATERIALS AT PROJECT SITE:** Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Store and handle materials in a manner to prevent damage or contamination with water or foreign matter.

4. It should be noted that Ceramic Tile Institute has recommended against the use of paper-backed wire.
  - a. If the paper interferes with a full mesh wire to wire lap required for reinforcing.
  - b. When the paper backed wire is cut the paper and wire terminate at the same line. When the cut material is lapped, the paper completely negates the necessary wire to wire reinforcing.