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ABSTRACT:
The code includes two very different requirements for exterior wall water-resistive barriers (WRB). When using cement plaster exterior finishes, ensure the WRB is equivalent to two layers of Grade D paper, and not Type I (No. 15) asphalt felt. There is a big difference between the two.

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KEYWORDS:
Cement plaster, stucco, water-resistive barrier, WRB, asphalt felt, Grade D paper, building paper, Acceptance Criteria, Evaluation Service

REFERENCES:
ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
UU-B-790A (1968) - Federal Specification Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent and Fire Resistant)

UBC Standard 14-1 (1997) - Kraft Waterproof Building Paper.

IBC - International Building Code 2009
IRC - International Residential Code 2009
AC38 - Acceptance Criteria for Water-Resistive Barriers (AC38)

Cement Plaster Water-Resistive Barrier

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Background

The building codes require water-resistive barriers (WRB) to be included as part of exterior wall assemblies. The minimum WRB is a single layer of No. 15 asphalt felt. Asphalt felt is commonly called building paper.

For cement plaster (stucco) finishes installed over wood-based (plywood or OSB) sheathing, additional code requirements apply. The equivalent of two layers of Grade D paper is required as the WRB for this application. Unlike asphalt felt, Grade D paper is asphalt saturated kraft building paper. Paper made by the kraft pulping process is stronger than paper made by other processes.

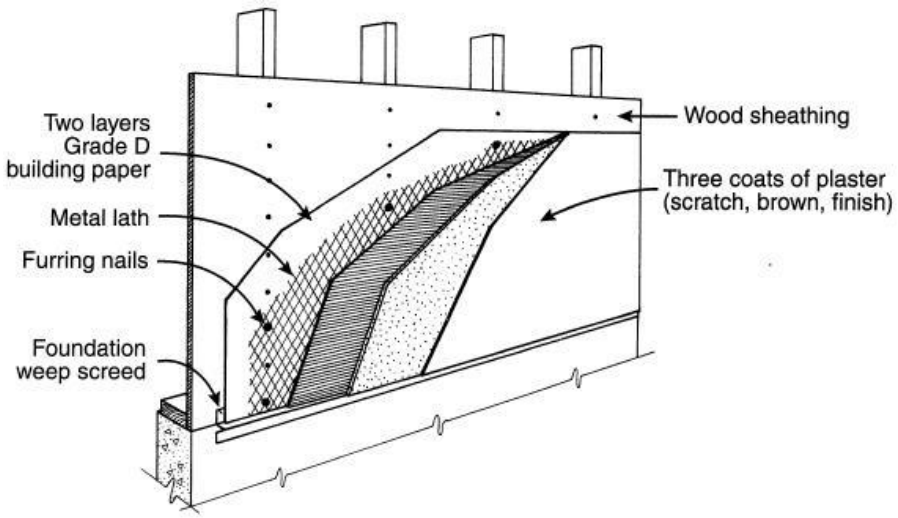
What makes plaster applications special?

Cement plaster will be in direct contact with the WRB. The first coat of plaster is pushed through the lath to form a mechanical bond. During installation, the plaster contacts the WRB. Plaster is absorbent. When exposed to regular wetting from rain or irrigation systems, the plaster becomes saturated. The moisture will be carried to the back of the plaster and to the WRB.
If the WRB is not water resistant, the moisture will penetrate to the underlying sheathing. If the WRB is not vapor permeable, moisture vapor under the WRB will not dry to the building exterior and may condense. Both conditions may lead to damaged sheathing. And when the sheathing is wood based, rot and decay may result.

This kind of damage requires an expensive fix and may leave the architect and builder vulnerable to litigation from the building owner.

Building Codes

The International Code Council (ICC) makes finding locations where



reference standards are cited easy. Chapter 35 of the IBC and Chapter 44 of the IRC list every standard that is cited by the code and the sections of the code where the citations occur. ASTM D226 is cited in 9 different locations and two tables and 9 different locations and one table in IRC.

Only IBC 1404.2 and IRC R702.3 address exterior wall assemblies. The codes require "a minimum one layer of No. 15 asphalt felt … complying with ASTM D226 for Type 1 felt" to be attached to the studs or sheathing as the WRB. All other code citations of ASTM D226 are for roofing applications.

IBC 1510.6 and IRC 703.6.3 require WRB for cement plaster finishes over wood based sheathing to be equivalent to two layers of Grade D paper. There is no standard cited for Grade D paper. Consulting the ICC Evaluation Service, Acceptance Criteria for Water Resistive Barriers (AC38) is used to evaluate product compliance with the code requirements.

AC38 requires compliance with the Uniform Building Code (UBC) Standard 14-1 for building paper. This standard relies on the historic federal specification UU-B-790A. What a round about way to specify a product.

Asphalt Felt is not Grade D Paper

Asphalt felt is governed by ASTM D226. Grade D paper is governed by UU-B-790A. They are not the same, not even remotely close to being the same.

Asphalt felt is performance tested for minimum breaking strength, pliability (ability to bend 90 degrees at 77 degrees F without cracking), and maximum mass loss on heating. Asphalt felt is offered as Type I (No. 15) and Type II (No. 30). The minimum required by code is Type 1.

Grade D paper is performance tested for minimum tensile strength, minimum 20 minute water resistance, and for minimum 3 perms water vapor permeance.

Using asphalt felt when Grade D paper is required is contrary to code Asphalt felt is not tested as Grade D paper. So asphalt felt cannot be shown to be equivalent to two layers of Grade D paper.

What are My Options?

The code does not require Grade D paper as the WRB for cement plaster over wood based sheathing. The code requires equivalent performance. What is equivalent? The International Code Council tries to help. The Evaluation Service (ES) offers ES Reports on products that are not specifically cited in the code. The reports permit products that are proven equivalent to code requirements to be used in specific applications.

There are ES Reports for weather-resistive barriers offered by 70 individual companies. Some of these are for multiple products from the same manufacturer. The products include numerous polymeric building wraps, Grade D papers, and liquid applied products. There are many products to choose from. None are asphalt felt!

So rely on the ES Reports. Read them carefully. The reports include product and application limitations as part of the conditions for acceptance by the Evaluation Service. Ask your WRB product reps to provide their product ES Reports.

Conclusion

Do not confuse asphalt felt with Grade D paper. Do not use the term "building paper." There is no known standard that defines a product called building paper.

Consider using the generic term "water-resistive barrier" to identify the material on the drawings. This is the term used by the code. Building officials will recognize the term when checking for code compliance.
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