STUCCO AND DRAINAGE PLANES

2ND EDITION

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Prepared by the Lath and Plaster Subcommittee
of the AWCI Codes and Technical Council

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2nd Edition. This document was updated to reflect new text in the 2024 IBC and IRC.
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This Stucco and Drainage Planes document was prepared by the Lath and Plaster Subcommittee of the AWCI Codes and Technical Council.

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Introduction and 2024 Changes

This document provides information on model code language specific to the requirement for a drainage system or drainage material behind exterior cement plaster ("stucco") cladding. The text reflects language found in the following:

- Chapter 25 of the 2021 and 2024 International Residential Code (IRC), and
- Chapter 7 of the 2021 and 2024 International Building Code (IBC).

Chapter 14 of the IBC and Chapter 7 of the IRC contain general information addressing water-resistive barrier (WRB) requirements for all framed exterior wall systems. While the general WRB language applies to stucco applications, the focus of this document is on new model code language specific to stucco applications.

This document does not reflect local amendments to or interpretations of model code language. Systems installed to comply with the requirements of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or NFPA 285 *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components,* must be constructed as tested.

Systems also must comply with locally enforced codes, standards and statutes, and jurisdictions must adopt model code language using a localized process. The contractor is advised to discern what is locally required for compliance and ascertain any fire-resistive requirements that must be met. Contractors also are urged to confirm the code language enforced on a specific project and if it has been modified to reflect local conditions.

What Does the Language Say?

Model codes historically have mandated that a framed exterior wall must provide "a means of draining water that enters the assembly" (2003 IBC Section 1403.2). The language is still in the current editions of the IBC and IRC.

A primary component of a framed exterior wall drainage management system is the water-resistive barrier ("WRB") applied over most sheathing substrates. A properly installed WRB provides a second line of defense against liquid water attacking water-sensitive sheathings and ultimately entering the stud cavity. Note that some sheathing is manufactured with an integral WRB.

Stucco-clad framed buildings constructed to the IBC or IRC typically must incorporate a WRB. Model code language addressing WRB installation is historic and was included in the first editions of the IBC and IRC published in 2000. While some WRB terminology has evolved—for example, "weather-resistant barrier" is now "water- resistive barrier"—the fundamental premise behind the need for a WRB has not changed.

But while the fundamental model code drainage and WRB language are unchanged, text added to model codes in 2021 and 2024 imposes additional and specific requirements for a means of drainage on exterior walls clad with stucco applied over defined sheathing materials in specific geographic regions. The new language does not impact other claddings.

The 2021 code language applies to applications where wood-based sheathings such as plywood or oriented strand board are used as a substrate for stucco on a framed exterior wall. The 2024 code language expands the requirements to other sheathings defined in the code. An example of the code language is provided in the appendix of this document.

Where Will this Change Occur?

The new, stucco-specific requirements primarily impact stucco projects located in defined moist or marine climate zones. A map from the International Energy Conservation Code (IECC), referenced by the IBC and IRC, defines the zones where the new requirements are enforced. The map divides the United States into

three broad climate zones: (A) moist, (B) dry and (C) marine. A listing in Chapter 3 of the IECC identifies all counties by zone for clarity.

Figure 1 below, the map, indicates that the Moist and Marine climate zones primarily encompass the U.S. West Coast, Hawaii, parts of Alaska, and most states east of the Rocky Mountains. Red arrows are added to the map to highlight the moist and marine climate zones.

Note that an individual jurisdiction can modify the map during its adoption process. The State of California, for example, broadened the marine geographical areas during its adoption of the 2021 model code set.

What Requirements Have Been Added to the Codes?

Specific model code language identifying prescribed drainage systems is contained in Section 2510.6 of the IBC and Section R703 of the IRC. The code language should be verified with the authority having jurisdiction and generally works as follows:

Dry climate zones require the application of the following:

1) A code-compliant two-layer WRB system, or
2) A code-compliant single-layer WRB supplemented by a non-water-absorbing material layer or a code-compliant means of drainage.

Moist and marine climate zones require compliance with the base requirements applicable to a dry climate zone installation, supplemented by a code-compliant drainage space or material. Alternatively, compliance can be achieved by installing a tested system that complies with drainage efficiency requirements outlined in the IBC or IRC.

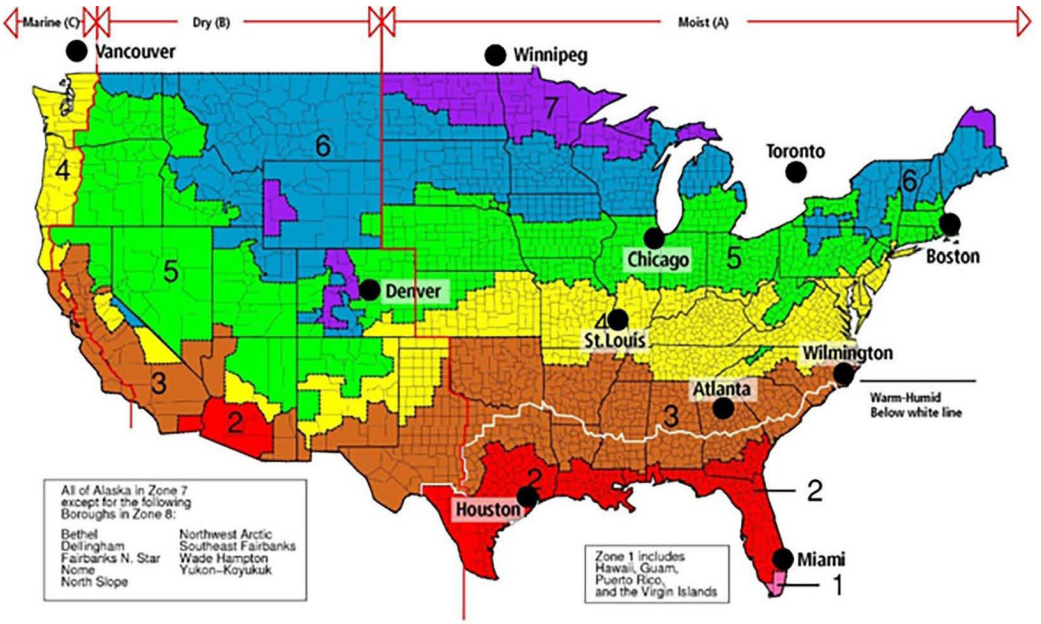
With all WRB options, it is imperative to install flashing at the appropriate locations as indicated in the code—for example, at the base of a wall or the head of a window.

WRB Options with Stucco

A two-layer WRB system includes either two layers of 10-minute Grade D paper or two layers of WRB materials with a water-resistance equal to two layers of ASTM E2556, *Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment, Type I* compliant material. Building papers are asphalt-impregnated kraft papers that are classified by the weight of the paper itself. The heavier the paper and asphalt content, the greater the water resistance.

Model codes also permit the use of a single-layer WRB, either a 60-minute Grade D paper or a WRB with a water resistance equal to one layer of ASTM E2556, *Standard Specification for Vapor Permeable Flexible Sheet Water- Resistive Barriers Intended for Mechanical Attachment, Type II* compliant material. Single-layer systems must also comply with specific drainage requirements contained in the code or incorporate a defined material that serves as a "bond-breaker" between the WRB and the sheathing.

Figure 1



Depending on the climate zone, the WRB system may need to be supplemented with a drainage space or drainage system. Code text should be consulted for additional information. In addition, using an ASTM E2556-compliant material requires verification that the WRB material and application comply with the noted ASTM standard.

Drainage Materials

While the model codes do not define the term "drainage material," RAiNA—the Rainscreen Association in North America—defines drainage as: "(t)he passive movement of liquid water by gravity." In addition, one manufacturer succinctly interprets that a drainage material "facilitate[s] the flow and drainage of incidental moisture from the wall assembly." Taken together, the two concepts suggest that a "drainage material" is a material designed to facilitate the movement of moisture from a wall system.

Architectural specification and code experts suggest following a performance-based format in the selection of drainage material. Two ASTM Standards that reference drainage materials are as follows:

- ASTM E2925, *Standard Specification for Manufactured Polymeric Drainage and Ventilation Materials Used to Provide a Rainscreen Function*
- ASTM E2273, *Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies*

Section 4 of ASTM E2925 lists the following types of drainage materials:

- Entangled mesh materials,
- Formed/textured sheet material and
- Formed battens.

In addition, ICC-ES Acceptance Criteria AC356, *Moisture Drainage Systems Used with Exterior Cement Plaster or Adhered Masonry Veneer Walls*, may provide a path for compliance. Use of materials or techniques described in an evaluation report or product listing compliant with AC 356 is subject to local jurisdiction approval.

The drainage material to be used should be identified in architectural specifications and appropriate for use with stucco. The material should be provided by a manufacturer that can supply necessary support information, including product evaluation documentation or test reports if required. Manufacturer installation instructions should be followed as individual drainage materials may have different installation requirements.

Appendix

Language from the 2021 and the 2024 IBC is presented verbatim. The language in the 2021 and 2024 IRC closely mimics that in the IBC; however, IRC language is often modified locally. While the IBC language can be used as a residential construction information point, contractors should review local code language before the stucco application.

The language is provided solely to provide context for the document. The specific code language and any modifications affected by a local jurisdiction should be consulted.

Language from the 2021 International Building Code

Section 2510.6. Water-Resistive Barriers

Water-resistive barriers shall be installed as required in Section 1403.2 and, where applied over wood-based sheathing, shall comply with Section 2510.6.1. or 2510.6.2.

Section 2510.6.1 Dry Climates

One of the following shall apply for dry (B) climate zones:

1) The water-resistive barrier shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of water-resistive barrier complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section 1404.4 and intended to drain the water-resistive barrier, is directed between the layers.

2) The water-resistive barrier shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of water-resistive barrier complying with ASTM E2556, Type II. The water-resistive barrier shall be separated from the stucco by a layer of foam plastic insulating sheathing or other non-water absorbing layer or a drainage space.

2510.6.2 Moist or Marine Climates

2510.6.2 Moist or Marine Climates

In moist (A) or marine (C) climate zones, water-resistive barrier shall comply with one of the following:

1) In addition to complying with Item 1 or 2 of Section 2510.6.1, a space or drainage material

not less than 3/16 inch in depth shall be applied to the exterior side of the water-resistive barrier.

2) In addition to complying with Item 2 of Section 2510.6.1, drainage on the exterior side of the water-resistive barrier shall have a minimum drainage efficiency of 90% as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.

Language from the 2024 International Building Code

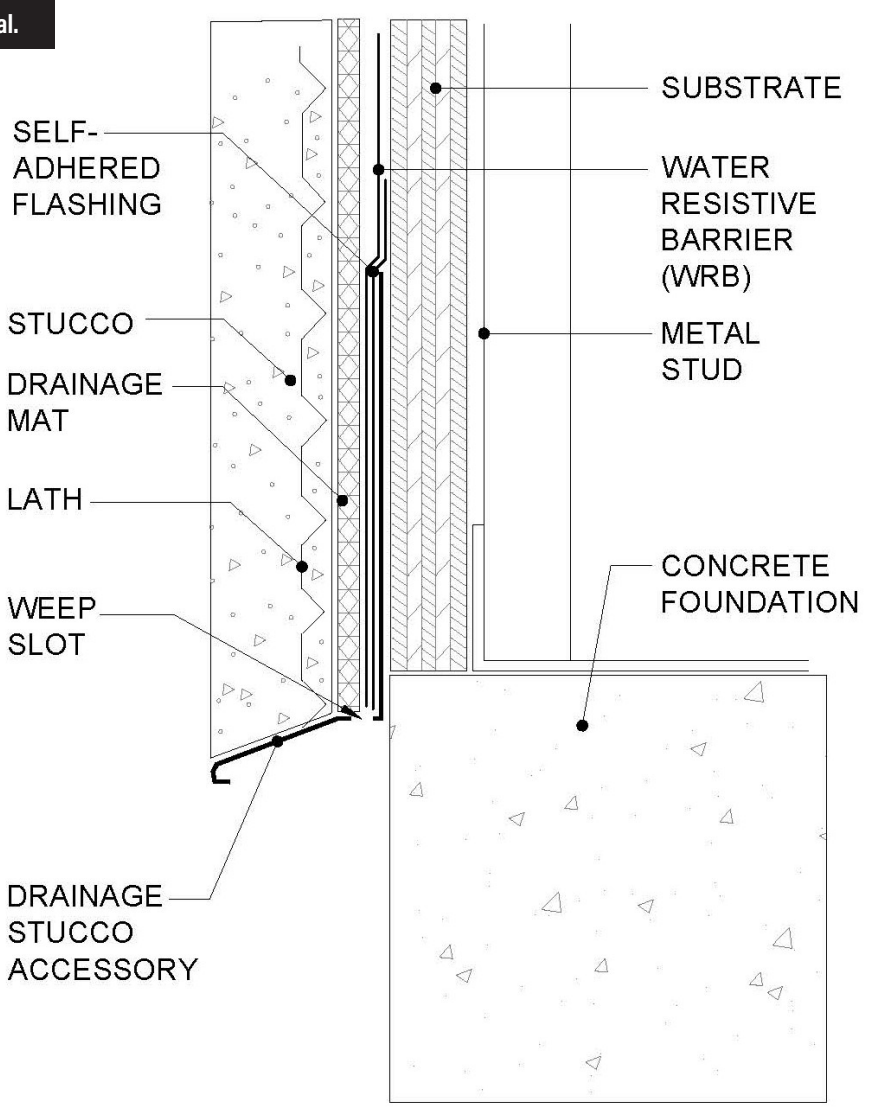
Language is as in the 2021 International Building Code except:

1) Section 2510.6 has been modified to read: Water-resistive barriers shall be installed as required in Section 1403.2 and shall comply with Section 2510.6.1. or 2510.6.2.

EXCEPTION: Sections 2510.6.1. and 2510.6.2. shall not apply to construction where accumulation, condensation, or freezing of moisture will not damage the materials.

2) Item 2 in Section 2510.6.1. has been modified to read: The water-resistive barrier shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of water-resistive barrier complying with ASTM E2556, Type II. The water-resistive barrier shall be separated from the stucco by a layer of foam plastic insulating sheathing or other non-water absorbing layer, or a drainage space or means of drainage complying with Section 2510.6.2. Flashing installed in accordance with Section 1404.4 and intended to drain to the water-resistive barrier shall be directed to the exterior side of the water-resistive barrier.

Draft detail of stucco system incorporating drainage material.



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