

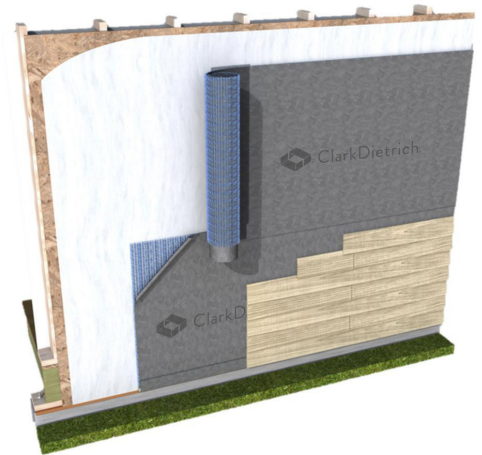
## Water Resistive Barriers and Rain Screens for Exterior Wall Coverings Including Portland Cement Based Plaster (Stucco) & Adhered Manufactured Stone Veneer (AMSV)

August 15, 2021

### BACKGROUND

Water resistive barriers are an intervening layer installed behind exterior wall coverings to resist moisture and provide protection to underlying components. Common types of water resistive barrier materials include roll goods such as Flexible sheets (ASTM E2556 Type 1 or 2) and Asphalt Saturated Organic Felt (ASTM D226 Type 1 No. 15 felt), specialized sheathings comprised of foam plastic, wood or gypsum-based products, fluid, liquid, or roller applied materials, and self-adhered membranes. Typically, the water resistive barrier is selected by the design professional based on considerations such as permeability, compatibility with the exterior wall covering and substrate, local environment, performance requirements, design preference, cost, and building code requirements.

Requiring or specifying a designed drainage space between the water resistive barrier and the exterior wall covering continues to be an emerging, growing industry trend and moisture management strategy. Common designed drainage methods include traditional, unventilated drainage cavities or spaces and rainscreen systems which consist of a drainage cavity, capillary break, plus ventilation to promote drying. Designed drainage spaces are commonly created by open design drainage mats which typically range in depth or thickness from 6 mm (1/4") to 10 mm (3/8"). Building code requirements for stucco and AMSV applied over wood based sheathing often require a two layer water resistive barrier or equivalent such as a water resistive barrier and an intervening material or spacer such as a drainage mat or a rainscreen system which provides a ventilated air space. ClarkDietrich E-Screen drainage mats are available in 6 mm and 10 mm thicknesses to create drainage spaces or ventilated air spaces for rainscreen wall applications.



## EXTERIOR PORTLAND CEMENT PLASTER (STUCCO) & ADHERED MANUFACTURED STONE VENEER (AMSV)

Water resistive barrier requirements for stucco and AMSV differ from that of many other exterior wall coverings. Below summarizes important items and considerations specific to stucco and AMSV applications:

- The water resistive barrier should be integrated with flashings, other building elements, lath such as Structa Wire Welded Wire Lath and Easy Embedment System accessories including weep screeds, joints, casing beads, etc.
- Fluid applied and similar water resistive barriers which are sometimes applied to concrete or masonry substrates generally require a mechanical bond or key such as Structa Wire welded wire lath for adhesion of stucco and AMSV.
- Water resistive barrier requirements and strategies may include designed drainage spaces that incorporate drainage mats or other means to create a rainscreen or unventilated drainage cavity.
- Minimize penetrations through the water resistive barrier by utilizing the minimum, prescribed number of fasteners necessary for Easy Embedment System (EES) lathing system components including Structa Wire welded wire lath and E Flange accessories.
- Water resistive barrier requirements for AMSV are based on installation with lath and mortar.

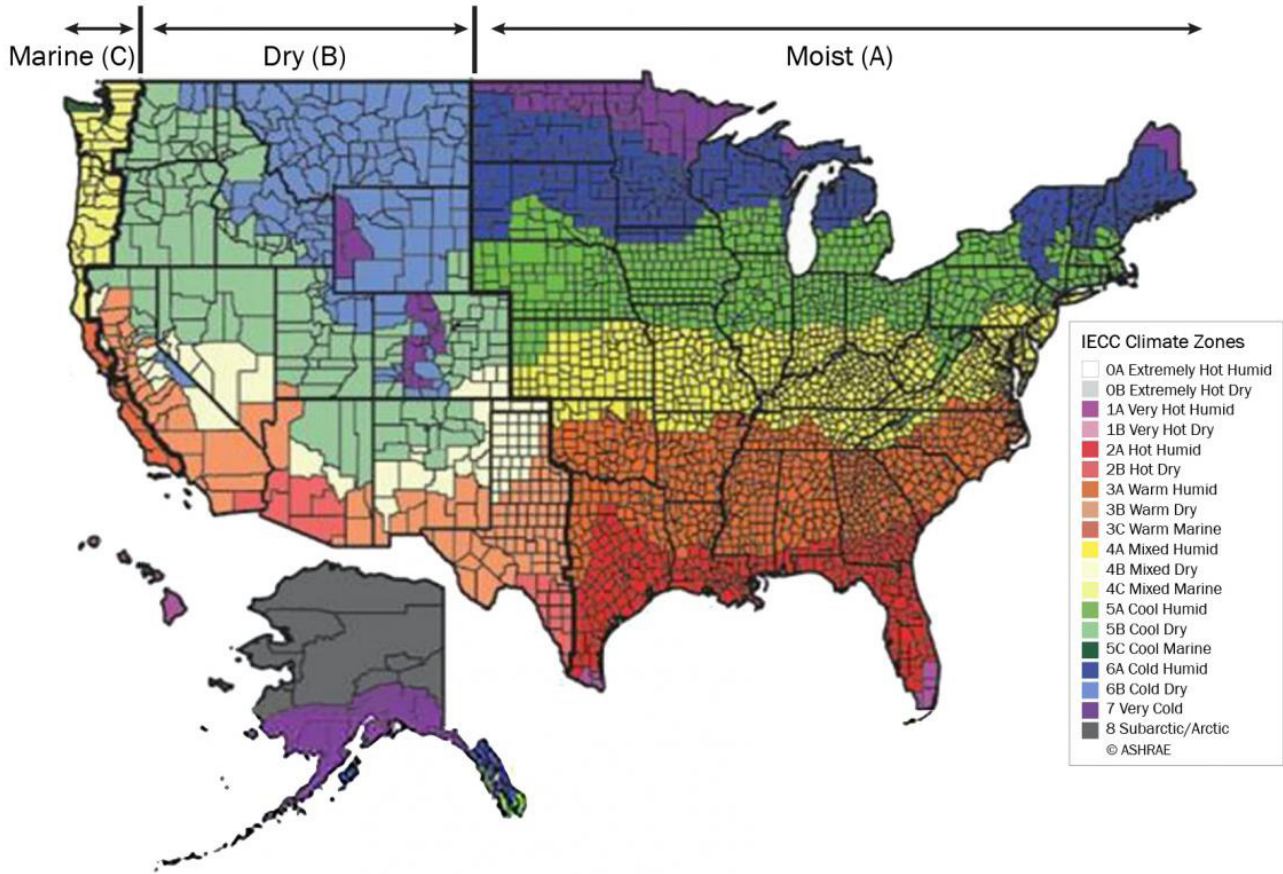
## 2021 INTERNATIONAL BUILDING CODE (IBC), 2021 INTERNATIONAL RESIDENTIAL CODE (IRC) AND 2020 FLORIDA BUILDING CODES (FBC) - COMMERCIAL AND RESIDENTIAL\*

Below is a summary of IBC, IRC, and FBC provisions for water resistive barriers used with stucco and AMSV wall coverings. The provisions can differ based on the building code, water resistive barrier material, type of substrate or backing and climate zone. Requirements for water resistive barriers include single or multiple layers and types of materials, designed drainage spaces also known as unventilated drainage cavities or spaces and cavities with ventilated air spaces which are commonly referred to as rainscreens.

Water resistive barrier requirements shown in italics are impacted by the Climate Zone or geographical location of the project. Figure 1 is the US Climate Zone map from the 2021 International Energy Conservation Code (IECC) which, based on geography, defines climates as Moist, Dry or Marine. Each zone is subdivided numerically as shown in Figure 1.

More detailed Climate Zone information is available by state, county, or territory in Table C301.1 of the 2021 International Energy Conservation Code (IECC). The following steps determine the water resistive barrier requirements for projects impacted by Climate Zone:

- Find the geographic project location based on Figure 1 or 2021 IECC Table C 301.1
- Locate the relevant Climate Zone
- Determine the water resistive barrier based on the applicable building code, section, and substrate or backing material



**Figure 1 - US Climate Zone Map (2021 IECC)**  
 Reference 2021 IECC - International Energy Conservation Code Web Site

## 2021 INTERNATIONAL BUILDING CODE (IBC)

### SUBSTRATE MATERIALS AND RELEVANT CODE SECTIONS

- **Concrete or Masonry**
  - 1402.2 Exception 1 – A water resistive barrier/envelope is not required provided walls are designed per IBC chapters 19 and 21 respectively\*\*
- **Wood Based Sheathing**
  - 2510.6.1 – Water resistive barrier options - dry climate zones
    1. Two layers of 10 minute Grade D paper or water resistance equal to or greater than two layers of water resistive barrier complying with ASTM E2556 Type 1. For two-layer applications, each individual layer shall be installed independently. The water resistive barrier and any flashings shall direct water to drain between the layers.
    2. The water resistive barrier shall be 60 minute Grade D paper or a water resistance greater than or equal to one layer of water resistive barrier complying with ASTM E2556 Type 2. The water resistive barrier shall be separated by an intervening layer or drainage space.
  - 2510.6.2 – Water resistive barrier options – moist or marine climate zones
    1. Comply with option 1 or 2 in 2510.6.1 with a space or drainage material not less than 3/16” in depth on the exterior side of the water resistive barrier.
    2. Comply with option 2 in 2510.6.1 and drainage on the exterior side of the water resistive barrier shall have a minimum drainage efficiency of 90 % per ASTM E2273 or Annex A2 of ASTM E2925
- **Other Sheathing Materials**
  - 1403.2 – Water resistive barrier options
    1. No. 15 felt complying with ASTM D226, Type 1
    2. ASTM E2556, Type 1 or 11
    3. ASTM E331 in accordance with Section 1402.2
    4. Other approved materials installed in accordance with the manufacturer’s installation instructions

## 2021 INTERNATIONAL RESIDENTIAL CODE (IRC)

### SUBSTRATE MATERIALS AND RELEVANT CODE SECTIONS

- **Concrete or Masonry**

- 703.1.1 Exception 1 – A water resistive barrier/envelope is not required provided walls are designed per IRC chapters 703.4 and 703.8 respectively\*\*

- **Wood Based Sheathing**

- 703.7.3.1 – Water resistive barrier options - dry climate zones
  1. Two layers of 10 minute Grade D paper or water resistance equal to or greater than two layers of water resistive barrier complying with ASTM E2556 Type 1. For two-layer applications, each individual layer shall be installed independently. The water resistive barrier and any flashings shall direct water to drain between the layers.
  2. 60-minute Grade D paper or water resistance equal to or greater than one layer of water resistive barrier complying with ASTM E2556 Type 11. 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 drainage space.
- 703.7.3.2 – Water resistive barrier options – moist or marine climate zones
  1. Comply with 703.7.3.1 item 1 and a space or drainage material not less than 3 / 16 inch in depth added on the exterior side of the water resistive barrier.
  2. Comply with 703.7.3.1 item 2 and drainage on the exterior of the water resistive barrier with an efficiency of not less than 90 percent in accordance with ASTM E2273 or Annex A2 of ASTM E2925.

- **Other types of sheathings**

- 703.7.3 – Water resistive barrier options
  1. No. 15 felt complying with ASTM D226, Type 1
  2. ASTM E2556, Type 1 or 11
  3. ASTM E331 in accordance with Section 1402.2
  4. Other approved materials installed in accordance with the manufacturer's installation instructions
- R703.2 - One layer of No. 15 asphalt felt complying with ASTM D226 for Type 1 felt or other approved materials

\* Refer to the applicable building code for complete requirements for stucco, AMSV and water resistive barriers. Building code requirements in local or other jurisdictions may differ from those in the IBC, IRC and FBC.

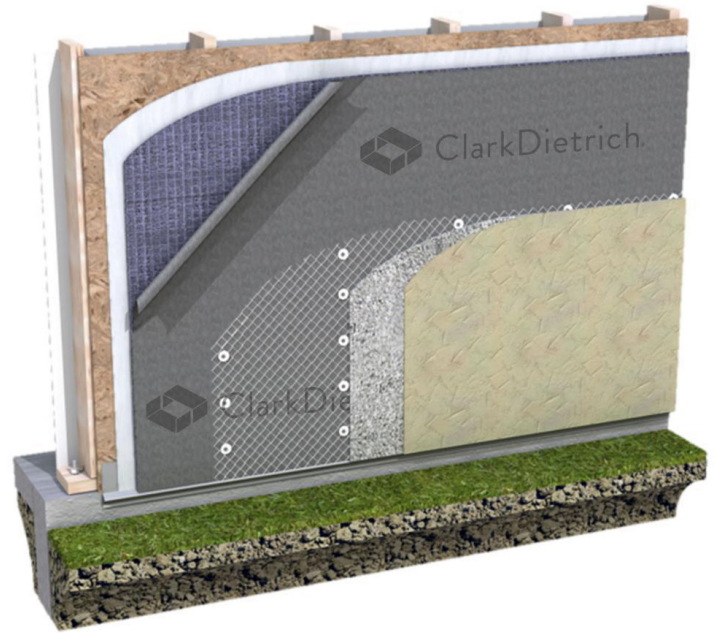
\*\*While not required, if a water resistive barrier is used over a solid plaster base, confirm the Exterior Portland Cement Plaster (Stucco) is compatible with direct applications to the water resistive barrier or install a metal plaster base such as Structa Lath welded wire lath over the water resistive barrier to allow keying of the stucco.



## E-SCREEN 6 (6MM) AND E-SCREEN 10 (10 MM) DRAINAGE MATS FOR EXTERIOR WALL COVERINGS

### INTRODUCTION

E-Screen 6 and 10 feature a 95% open design that provides an effective spacer for unventilated, drainage cavities and rainscreen systems which incorporate a cavity, capillary break and enable ventilation. They are for use with stucco, adhered manufactured stone veneer (AMSV), brick, and many other exterior wall coverings. E-Screen is a durable, polymer-based material that is corrosion-resistant, rust-proof, and mildew resistant. The two-ply design incorporates a backer fabric which alleviates blockage of the drainage space or cavity during stucco applications. E-Screen is available in 6mm (1/4") and 10 mm (3/8") thicknesses which satisfies a range of applications and building code provisions. Both products are produced in rolls that are lightweight and easy to install.



### E-SCREEN DRAINAGE MAT INSTALLATION

Below are important items regarding installation. Follow building codes, product literature and standards for complete information pertaining to types, uses, installation, etc.

- Install E-Screen over the water resistive barrier and after installation of windows, doors, penetrations, flashings, etc.
- Start\* at the base of the wall and unroll E-Screen Drainage Mat from right to left with the 4" fabric flap at the bottom of the wall. The three-dimensional (blue) side faces the water resistive barrier and the grey fabric side faces the building exterior. Fasten with sufficient corrosion resistant staples or nails into framing members so E-Screen remains in place prior to application of the exterior wall covering. Attachment of the exterior wall covering will secure E-Screen Drainage Mat in place
- Butt subsequent courses tightly together without overlapping. Pull the subsequent 4" flaps over the previous course in a shingle like fashion and staple or nail in place every 3 square feet.
- E-Screen should remain exposed to the weather no more than 30 days prior to installation of the exterior wall covering

\*Note: Below are instructions to create insect screens at the top and bottom of the walls.

1. On the first (bottom) course only, unfold the 4" fabric flap and tuck it between the blue polymer matrix and the water resistive barrier.
2. On the top course, invert the roll and unroll left to right with the 4" fabric flap at the top. Unfold the fabric flap and tuck it between the blue matrix and the water resistive barrier.

## ADDITIONAL INFORMATION AND RESOURCES

- ASTM C926 – Standard Specification for Portland Cement Plaster
- ASTM C1063 – Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement Plaster (Stucco)
- ASTM C1861 – Standard Specification for Lathing and Furring Accessories and Fasteners for Interior and Exterior Portland Cement Plaster
- ASTM E2556 – Standard Specification for Asphalt Saturated Felt Used in Roofing and Waterproofing
- ASTM D226 – Standard Specification for Vapor Permeable Flexible Sheet Water Resistive Barriers Intended for Mechanical Attachment
- ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E2273 – Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies
- ASTM E2925 – Standard Specification for Manufactured Polymeric Drainage and Ventilation Materials Used to Provide a Rainscreen Function
- ASTM C1780 Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer
- NCMA Manufactured Stone Installation Guide
- 2021 International Building Code (IBC), International Energy Conservation Code (IECC), and International Residential Code (IRC)
- 2020 Florida Building Codes (FBC)
- ClarkDietrich – [www.clarkdietrich.com](http://www.clarkdietrich.com)