

Is there a code requirement for an additional moisture barrier on an ICF wall system with an exterior stucco finish? The answer is no.

The Florida Building Code and the International Building Code 1403.2 Weather Protection states: "A weather-resistant exterior wall envelope shall not be required over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively."

Additionally, the concrete wall with Expanded Polystyrene (EPS) panels on either side is defined as a mass wall and not the more common cavity wall. Cavity walls produce moisture when the warm moist air comes into contact with the cool air within the cavity space. The mass wall provides no cavity for this to occur. Furthermore the concrete and EPS ICF system are inorganic meaning they are not susceptible to degradation from direct exposure to water vapor.

The International Residential Code 2006 does not require a vapor retarder in climate zones 1, 2 and 3 regardless of the use of exterior insulation (Section N1102.5 Moisture Control – Exception 2.) This includes all of Florida, Mississippi, Alabama and South Carolina and most of Texas, Georgia, and North Carolina.

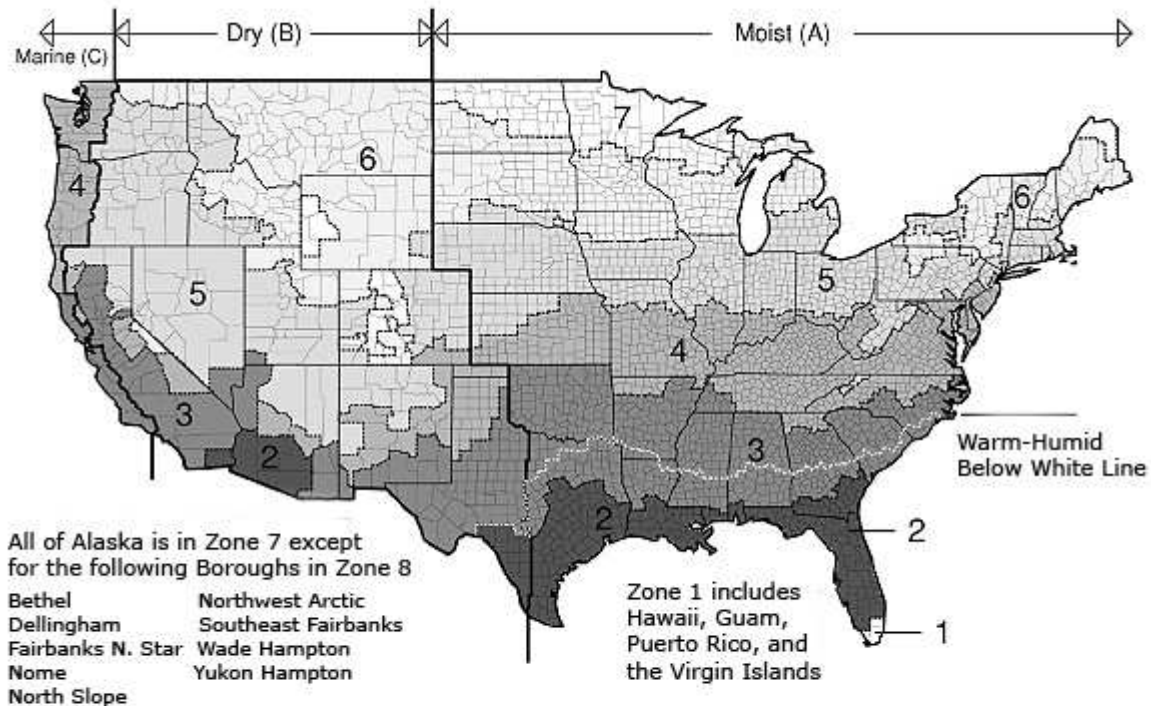


Figure 301.1, 2006 International Energy Conservation Code®

In the areas where IRC N1102.5 Exception 2 does not apply, the building code requires a Class I or a Class II Vapor Retarder on the "warm in winter" side of the wall assembly, which is satisfied by the Insulated Concrete Form (ICF). Since the 2" of EPS foam meets the Class II Vapor Retarder requirements, this satisfies the requirement on both the interior and exterior side of the wall assembly.

The accepted level of water vapor transmission of a Class II Vapor Retarder is generally less than or equal to 57 ng/Pa.s.m<sup>2</sup>. Several ICF form systems have been tested under ASTM E96 and have been found to perform in the 34 to 40 ng/Pa.s.m<sup>2</sup> range which is well within the 57 ng/Pa.s.m<sup>2</sup> limit for vapor barrier performance. Note that 1 US PERM is equal to 57.43 ng/Pa.s.m<sup>2</sup>.

However, in a traditional Portland cement stucco application the use of a building paper is sometimes used as a bond breaker and not as a vapor retarder. If this detail is used it is important to mechanically fasten the wire lath to the ICF fastener strips. It should be noted that direct application of traditional stucco to the ICF block is not recognized by ASTM C926.

The paper prevents the stucco from bonding to the ICF block to allow for movement due to thermal expansion and contraction and other forms of incremental deformation. Therefore, the mechanical fasteners should be designed for the component and cladding pressures for pull out and weight of the stucco for shear. ASTM C 1063 and ASTM C926 provide guidance on the size of metal lath, number and length of fasteners, and appropriate spacing of control joints and expansion joints.

There are however synthetic stucco finishes that do allow for the direct application and bonding to the ICF block. These systems are more correctly called Exterior Insulation and Finish Systems (EIFS) or Textured Acrylic Finish Systems (TAFS). This system is very popular in commercial construction and growing in residential applications especially on ICF wall systems. Several manufacturers including PermaCrete, Degaussa, Dryvit and GrailCoat offer specially formulated products for ICF application. The application methods for the synthetic stucco systems are slightly different and therefore the installer should refer to the manufacture's installation procedures.

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**References:**

- 2006 International Energy Conservation Code  
Figure 301.1
- International Residential Code 2006  
Section N1102.5 Moisture Control – Exception 2
- International Building Code  
1403.2 Weather Protection
- Florida Building Code 2007 w/ 2009 Supplements  
1403.2 Weather Protection
- ASTM E96 Standard Test Methods  
Water Vapor Transmission of Materials
- ASTM C 1063 and ASTM C926  
Application of Portland Cement based Plaster & Lathing

