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### Amended Declaratory Statement Request

Florida Building Commission  
c/o Paula Ford, Agency Clerk  
DBPR  
2555 Shumard Oak Drive  
Tallahassee, FL 32399-2100

RE: Petition for a Declaratory Statement from the Florida Building Commission Regarding Discrepancy in Insulation Values for Mass Walls in the Florida Building Code, Energy Conservation

In this matter, I am representing The Dow Chemical Company, which offers insulation products in the State of Florida. With the March 15, 2012 implementation date of the *2010 Florida Building Code, Energy Conservation*, Dow is seeking clarification of required insulation levels for mass walls utilizing the prescriptive compliance path in the Florida Energy Code, Chapter 4 which addresses energy efficiency provisions for residential construction.

Dow has been working with several insulation distributors, including G. Proulx, Fort Lauderdale, FL, BlueLynx, Miami and All Interior Supply, Orlando, FL and Hialeah, firms that are often asked questions regarding insulation requirements of the Florida Energy Code. It is common practice for distributors to request pertinent information from insulation manufacturers as to whether its insulation “meets” the Florida Building Code. Dow is committed to providing complete and accurate information regarding compliance with the Florida Energy Code to its customers, including distributors, home builders, architects and other design professionals. To that end, Dow, along with these distributors, found that there is a discrepancy in insulation values for mass walls using the prescriptive compliance path in Chapter 4 Residential of the Florida Building Code, Energy Conservation.

With respect to the prescriptive compliance path of the Florida Energy Code, Section 402.1.2 requires compliance with Table 402.1.1. It then offers three options:

- If Section 402.1.1.1 R-value computation method is chosen, the insulation required for mass walls is R-6 if the insulation is on the exterior of the wall and R-7.8 as stated in *footnote i* if more than half the insulation is on the interior of the wall.
- If Section 402.1.1.2 the U-factor alternative is chosen, the referenced Table 402.1.1.3 states that the insulation for mass walls is a U-factor of 0.124 (equivalent R-8) on the exterior of the wall and a U-factor of 0.165 (equivalent R-6) as stated in *footnote b* if more than half the insulation is on the interior of the wall.
- Since both methods are considered under the Prescriptive compliance path, these values for mass wall insulation should not be in conflict.

This declaratory statement requests recognition of a significant error for mass wall insulation in Table 402.1.1.3 footnote b (referred to in Section 402.1.1.2) that, if left uncorrected, results in less efficient homes than if any other prescriptive compliance path is taken.

Furthermore, mass wall insulation as currently stated Table 402.1.1.3 footnote b (referred to in Section 402.1.1.2) is in violation of Florida Statute. Energy related legislative materials circulated by the Florida Building Commission Staff in preparation for the March 7, 2012 meeting of the Energy Technical Advisory Committee stated,

“Code for new buildings **shall take into account exterior envelope physical characteristics (including thermal mass)**; HVAC, service water heating, energy distribution, lighting, energy managing & auxiliary systems design, selection, configuration and performance. [553/904, 553.905, FS]” (emphasis added)

Requiring more insulation on the exterior of the mass wall than on the interior of the mass wall negates the thermal mass effect in Florida climates and is therefore in violation of Florida law.

**Question 1:**

Are the  $U$ -values for mass walls incorrect as listed in Table 402.1.1.3 (referenced by prescriptive path section 402.1.1.2) and its applicable footnote b? Are the  $U$ -values stated in Table 402.1.1.3 in violation of Florida Law, because these values contradict the value of thermal mass by requiring more insulation on the exterior of the wall than the interior side of the wall?

**Background:**

Section 402.1 applies to the prescriptive path and contains 3 options, two of which are discussed here:

**402.1 General (Prescriptive).**

**402.1.1 Component, insulation and fenestration criteria.** The *building thermal envelope* and air distribution system shall meet the requirements of Table 402.1.1

**402.1.1.1 R-value computation.** Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component  $R$ -value. The manufacturer’s settled  $R$ -value shall be used for blown insulation. Computed  $R$ -values shall not include an  $R$ -value for other building materials or air films.

**TABLE 402.1.1  
COMPONENT EFFICIENCIES REQUIRED<sup>a,1</sup>**

% Glazing <sup>g</sup>	Fenestration U-Factor <sup>b</sup>	Sky-light U-Factor <sup>b</sup>	Glazed Fenestration SHGC <sup>b,e</sup>	Ceiling R-value	Roof Reflectance Tested per S. 405.6.2	Wood Frame Wall R-value	Mass Wall R-value <sup>a</sup>	Floor R-value/Slab R-value <sup>d</sup>	Door U-Factor	Ducts: R-value/Location <sup>k</sup>	Air Handler Location <sup>k</sup>	Air Leakage Tested per S. 403.2.2.1
20%	0.65 <sup>j</sup>	0.75	0.30	30	0.25	13	6 / 7.8	13/0	0.65	R-6/ Conditioned	Conditioned	Qn=0.03

For SI: 1 foot = 304.8 mm.

- a. R-values are minimums. U-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 × 6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- c. Percent glazing shown shall be the maximum glazing allowed for compliance by Section 402. Percent glazing area shall be measured in window to floor area and shall include skylight area.
- d. R-5 shall be the required slab edge R-values for heated slabs only; insulation depth shall be the depth of the footing or 2 feet, whichever is less. No insulation is required for unheated slabs, basement walls or crawl space walls.
- e. Reserved
- f. Reserved.
- g. Reserved.
- h. Reserved.

i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

j. For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building* the maximum U-factor shall be 0.75.

k. Conditioned= entire distribution system located inside both the thermal and air barrier of the home. Unconditioned = any portion located in unconditioned space.

l. Limitations to compliance by Section 402 found in Section 402.2 shall be met.

**Analysis:**

Insulation (Table 402.1.1) –for mass walls, R-value of 6 when the insulation is on the exterior of the wall and R-value 7.8 when more than half the insulation is on the interior of the mass wall.

**402.1.1.2. U-factor alternative.** An assembly with a U-factor equal to or less than that specified in Table 402.1.1.3 shall be permitted as an alternative to the corresponding component R-value in Table 402.1.1. All other prescriptive criteria of Table 402.1.1, the prescriptive criteria in Section 402.1.2.4 and footnotes to Table 402.1.1.3 shall be met.

**TABLE 402.1.1.3  
EQUIVALENT U-FACTORS<sup>a,f,g</sup>**

Fenestration U-Factor <sup>e</sup>	Skylight U-Factor	Ceiling U-Factor <sup>h</sup>	Frame Wall U-Factor	Mass Wall U-Factor <sup>b</sup>	Floor U-Factor	Basement Wall U-Factor <sup>d</sup>	Crawl Space Wall U-Factor <sup>c</sup>
0.65	0.75	0.035	0.082	0.124	0.064	0.360	0.477

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.165.

c. Basement wall U-factor of 0.360

d. Foundation U-factor requirements shown in Table 402.1.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. U-factors for determining code compliance in accordance with Section 402.1.1.3 (total UA alternative) shall be modified to include soil conductivity and exterior air films.

e. Window to floor area, including skylights, shall not exceed 20 percent. See Section 402.1.2.3.

f. Limitations to compliance by Section 402 found in Section 402.1.2 shall be met.

g. Ducts and air handlers shall be located inside both the thermal and air barrier of the home. Air leakage shall be no more than Qn=0.03 when tested per Section 403.2.2.1.

h. Roof reflectance shall be no more than 0.25 in accordance with testing to Section 405.5.5.2.

**Analysis:**

Equivalent *U*-factor (Table 402.1.1.3) – for mass walls, *U*-factor in the table is 0.124, with a footnote that states that where more than half the insulation is on the interior, the mass *U*-factor is a maximum of 0.165. The corresponding R-values for these *U*-factors are an R-value of 8 (*U*-factor of 0.124) for the exterior and 6 (*U*-factor of 0.165) for the interior.

**The Problem:**

There is an inherent conflict in thermal performance between the two tables:

Mass Walls – Insulation Levels	R-value if insulation on exterior	R-value if half insulation in on interior
Table 402.1.1	6	7.8
Table 402.1.1.3 (converting <i>U</i> -factor to R-value*)	8	6

\* the lower the *U*-factor, the higher the R-value

Building science and, as stated in the *2009 International Energy Conservation Code*, dictate that placing insulation on the exterior of mass walls in the Florida climate is more efficient due to the mass effect. Therefore the R-values cited in Table 402.1.1 of R6 for insulation placed on the exterior side of the wall and R7.8 when more than half the insulation is on the interior side of the wall is correct.

Furthermore, mass wall insulation as currently stated Table 402.1.1.3 (referred to in Section 402.1.1.2) is in violation of Florida Statute. Energy related legislative materials circulated by the Florida Building Commission Staff in preparation for the March 7, 2012 meeting of the Energy Technical Advisory Committee stated,

“Code for new buildings **shall take into account exterior envelope physical characteristics (including thermal mass)**; HVAC, service water heating, energy distribution, lighting, energy managing & auxiliary *systems design, selection, configuration and performance*. [553/904, 553.905, FS]” (emphasis added)

Requiring more insulation on the exterior of the mass wall than on the interior of the mass wall negates the thermal mass effect in Florida climates.

Table 402.1.1.3 contains an error that resulted from “Comment after glitch”, when one word in footnote b was changed - from “exterior” to “interior”. *This results in insulation values that are opposite to those in Table 402.1.1.*

“b. When more than half the insulation is on the ~~exterior~~interior, the mass wall *U*-factors shall be a maximum of 0.165. 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall *U*-factor in Marine Zone 4 and Zones 5 through 8. **[COMMENT AFTER GLITCH]”**

This one word change in Footnote b of Table 402.1.1.3 results in a less efficient mass wall than is required. This means that when insulation is added to the interior of a mass wall it needs only to comply with the equivalent of an R6 not the intended R7.8 equivalent. This error causes over a **20% deficiency** in thermal performance for mass walls if the *U*-factor alternative compliance path is chosen. Furthermore, we are concerned that these

erroneous values are included in the software used to demonstrate compliance with the *Florida Building Code, Energy Conservation*.

**Question 1:**

Are the *U*-values for mass walls incorrect as listed in Table 402.1.1.3 (referenced by prescriptive path Section 402.1.1.2) and its applicable footnote b? Are the *U*-values stated in Table 402.1.3 in violation of Florida Law, because these values contradict the value of thermal mass by requiring more insulation on the exterior of the wall than the interior side of the wall?

**Question 2:**

If only the insulation for mass walls, as shown in Table 402.1.1 and Table 402.1.1.3 meets the applicable R-factor or U-factor, does this alone constitute “compliance with the Florida Energy Code”, or must all footnotes contained within Table 402.1.1.3 also be met in order to use the prescriptive path?

**Question 3:**

How has the compliance software and applicable reports derived from this software address the discrepancies in the insulation values for mass walls using the prescriptive compliance path as well as the requirement that ALL footnotes shown in Table 402.1.1 and Table 402.1.1.3 must be met before compliance with the Florida Energy Code can be claimed?

Sincerely,



Lorraine A Ross

CC: Mo Madani, CBO, FBC Technical Unit Manager