

## 2010 Florida Building Code, Energy Conservation DOES Allow for Integral Insulation in Commercial and Shell Building CMU Walls and DOES NOT Require R30 Insulation.

Considerable confusion exists among architects, engineers and even building officials in Florida concerning integral insulation in CMU walls. They incorrectly believe the current 2010 FBC, EC does not acknowledge the insulation contribution of insulation materials filling the empty core cells of CMU walls e.g. integral insulation.

They are also confused in believing that the 2010 FBC, EC establishes R30 insulation as a mandatory requirement in the exterior walls of new construction or shell buildings.

### INTEGRAL INSULATION

Confusion concerning the prohibition of claiming the R-value of integral insulation in concrete masonry stems from this statement in Section 502.2.2.1.1:

*“The R-value of integral insulation installed in concrete masonry (CMU) shall not be used in determining compliance with Table 502.1.1.1(1) or Table 502.1.1.1(2).”*

Section 101.4.9 of the 2010 FBC-EC requires shell buildings to comply with Sections 502, 503, 504 and 505 (the prescriptive compliance method) **OR Section 506 (the performance compliance method).**

**Section 502.2.2.1 applies only to shell buildings designed by the prescriptive requirements of Table 502.1.1.1(1) or renovations and alterations designed by the prescriptive requirements of Table 502.1.1.1(2). It does NOT apply to new construction where interior systems are included in the design, or to shell buildings designed under Section 506 – Total Building Performance.** (A “shell building” is a commercial building that is permitted prior to design completion or which will be finished in sections at a time after construction of the shell.) **This restriction on the inclusion of the insulation value from integral insulation in “shell buildings, renovations and alterations” does not exist in the 5<sup>th</sup> Edition FBC, EC**

or the 2012 IECC when designed using the U-factor alternative provided in Section C402.1.2. The confusing section from the 2010 FBC, EC appears below:

#### 502.2.2.1 Shell buildings, renovations and alterations.

**502.2.2.1.1 Above-grade walls.** The minimum thermal resistance (R-value) of the insulating material(s) installed in the wall cavity between the framing members and continuously on the walls shall be as specified in Table 502.1.1.1(1) or Table 502.1.1.1(2), based on framing type and construction materials used in the wall assembly. **The R-value of integral insulation installed in concrete masonry units (CMU) shall not be used in determining compliance with Table 502.1.1.1(1) or Table 502.1.1.1(2).**

Again, 502.2.2.1 has nothing to do with new construction where interior systems are included in the design and nothing to do with shell buildings designed under Section 506 – Total Building Performance.

### MINIMUM R VALUES IN EXTERIOR WALLS

The confusion with the amount of insulation required in the exterior CMU walls of new construction emanates from Section 501.2 which states:

*“The new commercial building construction or addition project shall comply with the requirements of Section 506, provided that the applicable prescriptive and/or mandatory provisions of Sections 502, 503, 504 and 505 are each satisfied.”*

First - it is important to note the code **REQUIRES** the use of Section 506 to calculate the energy compliance for all new commercial construction and all shell buildings (Section 101.4.9 and Section 501.2). Section 506 is the “TOTAL BUILDING PERFORMANCE” section of the commercial energy conservation code. This

requires a complete analysis of the building and envelope utilizing an energy computer program that is approved by the Florida Building Commission (e.g. Energy Gauge Summit). **In no way shape or form does Section 506 prohibit the use of integral insulation in CMU walls.**

**Second - Section 506 does not mandate ANY specific level of wall insulation** as the required insulation level is dependent on all of the other energy efficiency aspects of the entire building. **In some cases you could construct a CMU wall with zero insulation, depending on the rest of the energy related features of the building.** This is rarely (if ever) done because it would not be a cost effective way to achieve energy efficiency. The point is that there is no “minimum” value required as long as the “TOTAL BUILDING PERFORMANCE” calculation meets the code requirements.

Although this approach is performed by computer modeling, Section 501.2 of the code also requires compliance with “mandatory provisions or applicable prescriptive criteria”. This is where the confusion entered. Tables 502.1.1.1(1) for “Shell Buildings” contained a column labeled “Mandatory” and required R30 insulation in exterior walls of “Shell Buildings”. **It has been incorrectly asserted by some that these values applied to new construction (or “shell” construction) analyzed by Section 506. This is simply wrong.**

The “Mandatory” column heading in Table 502.1.1.1(1) was corrected in the FBC 2012 Glitch Cycle to read “Requirement” meaning “required prescriptively if the shell of the building was permitted prior to being able to run a full Section 506 analysis”. In no case would the table be applied to new construction other than “shell buildings” as the title is very clear – “ENVELOPE PRESCRIPTIVE MEASURES FOR SHELL BUILDINGS”.

### **SUMMARY OF FLORIDA REQUIREMENTS IN THE 2010 FBC, EC**

- THE 2010 FBC, EC CONTAINS NO PROHIBITION TO USING INTEGRAL INSULATION IN CMU WALLS OTHER THAN “SHELL BUILDINGS ADDITIONS OR ALTERATIONS” PERMITTED USING THE PRESCRIPTIVE PATH.
- ALL NEW COMMERCIAL CONSTRUCTION AND SHELL BUILDINGS MUST BE FULLY ANALYZED BY AN APPROVED COMPUTER PROGRAM PER SECTION 101.4.9 AND 501.2 WHEN COMPLETION OF THE BUILDING OR PART OF THE BUILDING IS PERMITTED. THE FINAL ANALYSIS IS OF THE TOTAL BUILDING PERFORMANCE IN ACCORDANCE WITH SECTION 506 (E.G. ENERGY GAUGE SUMMIT).
- THERE IS NO MINIMUM INSULATION REQUIREMENT FOR CMU WALLS IN COMMERCIAL BUILDINGS, INCLUDING SHELL BUILDINGS, ANALYZED IN ACCORDANCE WITH SECTION 506, ON TOTAL BUILDING ANALYSIS.
- MOST OF THIS CONFUSING LANGUAGE GOES AWAY IN THE FBC-EC 5<sup>TH</sup> EDITION (JUNE 30<sup>TH</sup>, 2015) WHERE THERE IS NO RESTRICTION IN THE USE OF INTEGRAL WALL INSULATION WHEN THE U-VALUE ALTERNATE (SECTION C402.1.2) IS USED.