Insulation and the 2012 Energy Code

By Steve Fechino

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CODES: THEY CAN BE CONFUSING TO KEEP UP WITH AS WE MANAGE OUR BUSY MASONRY OPERATIONS. Many of us have heard that the 2012 Energy Code will bring tremendous change to the industry. However, the changes to the code actually are widespread to the building industry and are met with compliance, with many of the current systems and products we are installing daily.

The code does have many changes. For instance, entire heating, ventilation and air conditioning (HVAC) systems will require improvements to the mechanical systems and duct work. Window glazing and performance criteria are becoming more stringent, and the insulation requirements for the masonry industry have been written to higher performance levels. There are many rumors about how the changes will limit the available products with which we can build, once the code is adopted. This article will provide simple explanations to the code and provide some helpful insight to how the industry is dealing with the changes.
The code is a written model that will be adopted state by state, jurisdiction by jurisdiction. Therefore, the changes will not be across the board. To determine how the code will affect your operation, a visit to the Department of Energy’s website will provide you with additional information, www.energycodes.gov.

The energy code is important to all of us, because it is a positive step in the country’s reduction of energy consumption through design, construction and the operation of newer structures within our communities. The first step is important to react to the changes as soon as possible, since we all will be affected by the code sooner or later. Preparing now will make the transition easier.

The prescriptive energy code for the masonry industry is based, primarily, on the requirement for continuous insulation within the wall envelope. This becomes an issue when you look at the standard concrete masonry unit (CMU) and realize that the crosswebs allow for thermal bridging. By reducing the cross-web dimension, the efficiency of the unit is increased. However, this, by itself, is not the solution. With this in mind, it is now important to look at the criteria for compliance.

Changes to other important codes are:

**ASTM C90-11 b – Hollow Loadbearing Concrete Masonry Units**

This will allow cross web configurations to regulate by cross sectional section area, not by web thickness. Reasons for paying attention to this code change are as follows:

- The change can increase R-values
- Structural characteristic and performance will not be changed
- In some cases, a reduction in cost may be achieved
- Creates a smaller demand for sustainable materials to produce the units.


- Language in the next building code will exempt the NFPA test when material flame indexes are met to published standards and airspaces that contain insulation are one inch (25 mm) or less.

The new language that was approved for inclusion in the next building code that exempts NFPA 285 testing:

Envelopes where rigid or spray applied insulation is encased by at least one inch (25 mm) of masonry, and there is no gap between the insulation and the masonry; or the insulation and the CMU are not separated by an airspace greater than one inch (25 mm), and the insulation has an index for flame rate meeting requirements of ASTM E 84 or UL 723.
The thermal resistance (R Value, which indicated the ability of a wall system to resist heat transfer through the CMU wall) and the mass of a CMU wall can, in some cases, meet the code in the warmer climates. But this is not the standard case for most readers. Various types of insulation are used to develop the many single-wythe and cavity wall systems that we install. Rigid insulation, foam inserts, dry loose fill, injected foam, spray-on foam and proprietary block design round out the field increasing R values, typically from 5 to 25.

With the three methods available to determine code compliance, many of the current available masonry systems and designs will show acceptable numbers in at least one of the three criteria. Other important inherent factors of a CMU are the envelope's design, specifications and materials that make up the assembly, as different manufactures of CMUs have similar, but different, mixes. This is one factor that can change the R value and the thermal mass performance of similar envelopes.

Other factors include geographical climate history, insulation specifications—either within the CMU or placed within the cavity—and the actual cross section of the CMU that comprises the wall design. See TEK 6-2B, R-Values and U-Factors (R-value = 1/U-factor) of Single Wythe Concrete Masonry Walls. The document will discuss thermal performance of a CMU wall and its thermal performance, based on material properties.

It is important to clear up the rumor that all masonry walls will require continuous insulation. There are many ways a designer can achieve compliance using complete building systems that will meet International Energy Conservation Code (IECC) requirements.

At the present time, three methods for determining compliance exist: prescriptive, compliance software (performance) and whole building analysis.

The prescriptive method uses a series of material or assembly requirements to meet compliance. For example, one can use the tabulated values for mass walls that specify requirements for continuous insulation to determine compliance. This is the method that most manufacturers and designers are using today. Many of the products and systems on the market that are available to the masonry industry gain compliance through this method.

The prescriptive method may not be a part of the next code, so it is important to keep an open mind to developing newer technologies and improvements to existing systems for future compliance to the code. Using the prescriptive tables is straightforward, and it also is limiting regarding design flexibility. The prescriptive tables are easy to use, but make some masonry wall types difficult or impractical to build.

The compliant software method or the performance method uses software developed to determine code compliance using a straightforward method. There are two popular programs available, ENVSTD and COMcheck. Though the programs differ with their capabilities, they both can offer the masonry industry thermal property constants for various masonry wall configurations. Depending on which part of the energy code that needs to be met, these programs can offer wall configurations meeting code as well as having compliance with the IECC in many cases.

COMcheck is a bit more complex to use, but offers options to modify many components within the structure that then can be compiled to achieve compliance, offering the design community the ability to use the products we know how to bid, construct and sell in energy-efficient buildings of the future. Once the designer compiles all of the information, if compliance is not met, they can adjust various properties of the building envelope to meet the code requirements. COMcheck can be downloaded for no charge at www.energycodes.gov.

Whole building analysis is not widely used today, but it is the upcoming method that will prevail in the near future. As discussed as the upcoming status quo, this method uses software that takes the entire building and performs a whole building analysis that will analyze annual total energy use, rather than individual component compliance. This method shows that the new method of design should reduce energy costs, when compared to standard building methods. The whole building method not only takes into account the wall types, but also includes the entire building envelope information, mechanical and lighting specifications to determine compliance.

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