NATIONAL CONCRETE MASONRY ASSOCIATION
Sustainable Concrete Products for Structures and Hardscapes

What options are available for complying with the International Energy Conservation Code?

The International Energy Conservation Code (IECC) provides several different, independent methods of complying with the minimum energy efficiency requirements for commercial construction: prescriptive, trade-off or system performance, and whole building energy analysis. These alternatives are permitted for each of the various editions of the IECC. The prescriptive method is often the easiest to apply, but concurrently offers the least flexibility most conservatism of the three options[1]. If a building envelope does not comply using the either the prescriptive R-Value or U-Factor requirements, another option is to use a software tool such as COMcheck[2].

COMcheck determines compliance for the building envelope based on the specifics of the building under consideration and on the project location. Using this option, the designer "builds" a description of the building, entering basic data (size, type of construction, R-value of insulation, etc.) for the building envelope elements (roof, exterior walls, windows, doors, floor, basement and skylights). After the building envelope description and project location are defined, the program displays how close the envelope as entered comes to meeting the specified code requirements. If the envelope fails to comply, it is typically a simple matter to adjust individual elements to bring the envelope into compliance.

Note that using COMcheck is an alternative to complying via the prescriptive requirements, either the prescriptive R-Value or U-Factor requirements. The envelope components do not need to meet the prescriptive requirements if the envelope is shown to comply using COMcheck. COMcheck includes compliance options for various editions of the IECC as well as many state modifications to the IECC.

While COMcheck provides enhanced design flexibility, with a little bit of added complexity over the prescriptive tables, there are some inherent limits to the approach that can result in extra conservatism. For example, the U-Factors for integrally-insulated (masonry cell insulation) single wythe walls embedded in the program assume conventional CMU with both vertical and horizontal partial grouting. Hence, the U-Factor built into the wall assembly list of COMcheck can be conservative in many cases. For a wall with better thermal properties than the default values provided in the program, should define their mass wall assembly separately rather than using the software defaults. This process is discussed in TEK 6-4B[3].

The final option for energy code compliance is to use a whole-building energy analysis. A whole-building analysis, such as that performed using the EnergyPlus[4] software package, analyzes the energy impacts of the entire building, including factors such as interior components, lighting, HVAC, and occupancy patterns. The result is an estimate of annual energy use and/or cost for the building as a whole. A whole-building analysis is performed in accordance with ASHRAE/IESNA Standard 90.1 Appendix G, *Performance Rating Method*[5]. Use of Appendix G complies with IECC Section C401.2[6], which states that the building may demonstrate compliance with ASHRAE/IESNA Standard 90.1 as an alternate to the requirements listed in the IECC.

References

[1] NCMA FAQ 12-14, 2014, "Do concrete masonry walls require continuous insulation?", National Concrete Masonry Association, www.ncma.org.
[2] COMcheck, U.S. Department of Energy, https://www.energycodes.gov/comcheck.
[3] NCMA TEK 6-4B, 2012, "Energy Code Compliance Using COMcheck", National Concrete Masonry Association, www.ncma.org.
[4] EnergyPlus, U.S. Department of Energy, http://apps1.eere.energy.gov/buildings/energyplus/.
[5] ASHRAE/IESNA Standard 90.1, 2013, "Energy Standard for Buildings Except Low-Rise Residential Buildings", ASHRAE, www.ashrae.org.
[6] International Energy Conservation Code (IECC), 2012, International Code Council, www.iccsafe.org.