OHIO RESIDENTIAL ENERGY CODE COMPLIANCE METHODS (Jan 2013)

The contents of this appendix to the Administrative Code is not adopted material but is approved by the Board of Building Standards (BBS) and provided as a reference for users.

The Ohio Board of Building Standards recognizes that a number of methods and compliance tools have been developed to aid in determining energy code compliance for residential buildings. The following methods and compliance tools have been reviewed by the BBS staff and are considered acceptable methods of demonstrating compliance with Chapter 11 of the Residential Code of Ohio (RCO):

Prescriptive Methods: These methods are, by far, the simplest and fastest methods of demonstrating code compliance. However, they are also generally quite conservative, have several limitations and restrictions for its use, and sometimes, are not the most economical.

The user simply follows the predefined requirements listed in a table, or group of tables and the mandatory requirements specified in the code text. The table(s) lists the required R-values for fenestration (U-factor), skylights (U-factor), ceilings, walls, floors, basement walls, slabs, and crawl space walls, based on climate zones. Sections 402.1 through 402.5 of the 2009 International Energy Conservation Code (IECC) offer simplified predefined prescriptive envelope requirements that can be used for one-, two-, and three-family dwellings. Similarly, Sections 1101 through 1104 of the RCO Chapter 11 offer predefined prescriptive envelope requirements that can also be used. These 2009 International Residential Code-based options have been Ohio-modified to make them identical to the 2009 IECC requirements. Finally, two other uniquely Ohio prescriptive options are found in RCO Chapter 11, Section 1105, the Ohio Home Builders Association (OHBA) Alternative Energy Code Option. Within Section 1105, the builder/designer/owner has two prescriptive compliance paths to choose from, both were determined to provide an equivalency with the 2009 IECC.

To demonstrate code compliance using a predefined prescriptive method, one would simply identify on the construction documents which prescriptive method was selected and ensure that sections and elevations are provided that adequately illustrate and identify the climate zone; the glazing areas; insulation R-values, dimensions, and thicknesses; equipment and lighting details that correspond to the requirements shown in the code. The construction documents must then be submitted to the building department for approval.

Trade-off Method: This method is the most popular method of demonstrating energy code compliance. It is a bit more involved but less restrictive than the prescriptive method.

This method of compliance allows for limited building envelope component trade-offs. In other words, the user is permitted to reduce energy efficiencies of certain building envelope components as long as the efficiencies of other building envelope components are increased to compensate for the reductions. The idea is that the overall total building envelope UA as calculated, using a method consistent with the ASHRAE Handbook of Fundamentals, is less than or equal to the total UA as calculated by using the U-factors from an "Equivalent U-Factor" table and multiplying them by the corresponding areas of the components. This trade-off method, called the Total UA alternative and

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described in Section 402.1.4 of the 2009 IECC and Section 1102.1.3 of the RCO, can be used as an alternative to the prescriptive methods for one-, two-, and three family dwellings.

The most popular component trade-off software and on-line software packages are available on the website of the U.S. Department of Energy (DOE), Building Energy Codes Program (BECP), at www.energycodes.gov   This site has been developed by the DOE and offers free residential downloadable software and residential on-line software, which performs all required calculations based on user-provided insulation R-values and areas. Both the RES*check* downloadable software and *the* RES*check-WEB* on-line software tool permits residential building component trade-offs as described in Section 402.1.4 of the 2009 IECC and Section 1102.1.3 of the RCO.

Performance Method: This method is the most time consuming of the three compliance methods. However, this method also allows for the most flexibility because it evaluates the big picture, the entire building system, not just the components. It takes into account many more variables that affect energy efficiency such as window orientation, shading coefficients, types of mechanical equipment and lighting/power systems and offers credit for renewable energy sources such as solar, fuel cells, thermal energy storage. This method is the only method that can be used to show energy compliance when using nontraditional or unusual building design features or components. It works by comparing the proposed building design to that of a known building design of acceptable annual energy usage. The known design is that of a building that was constructed using the prescriptive tables.   The proposed building is acceptable if it can be demonstrated that the proposed design is at least as energy efficient as the known design.   Section 405 of the 2009 IECC offers a performance method called the Simulated Performance Alternative approach that can be used for one-, two-, and three-family dwellings as an acceptable alternative to the prescriptive or trade-off methods.

Due to the complexity of the performance method analysis, various manufacturer's representatives and governmental agencies have developed software packages that must be used to demonstrate compliance.   For the residential Simulated Performance Alternative approach (IECC Section 405), REM/Design, REM/Rate, EnergyGauge, and DOE-2 are a few of the acceptable software packages available on the market.

In all cases, whether using downloaded or on-line software, the user must be careful to input into the software the specific edition of the energy code referenced by the RCO (i.e. 2009 edition of the IECC). Remember the old cliché…Garbage in =Garbage out!   All of these software packages should have the ability to print out data input and compliance reports (which indicate the specific edition of the referenced energy code) that can be submitted to the building department for approval.

The Board of Building Standards staff is available to answer any questions concerning these compliance options. Call (614) 644-2613.

For specific technical questions related to the use and development of the DOE software packages referenced in this document, we would recommend reading the RES*check* User's Guides which are available for download on the www.energycodes.gov website.