Setting the Standard

Summer 2003 Volume 12 • Issue 1

In This Issue...

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

U.S. DEPARTMENT OF ENERGY

RES*check*-*Web*™ New Web-Based Compliance Tool

Get all the functionality of your **RES*check*™** desktop software over the internet with the new **RES*check*-*Web*™** compliance tool. **RES*check*-*Web*** has the following features:

- ✔ Requires no download or installation of software on your desktop
- ✔ Demonstrates compliance to '92, '93, '95 MEC, '98 IECC, and 2000 IECC
- ✔ Code changes will not require additional downloads
- ✔ Performs the same UA calculation as the desktop software
- ✔ Saves your projects online for easy access from work or home.

To use this new tool, go to **http://bldgcode.pnl.gov/REScheckWeb**.

2003 International Energy Conservation Code

New Requirements for Residential Buildings

The International Code Council (ICC) has recently issued the 2003 editions of their family of codes, including the International Energy Conservation Code (IECC). The requirements for residential buildings in the 2003 IECC are largely the same as those in the 2000 IECC. Increased duct insulation and lenient envelope requirements for sunroom additions are the main changes. Other changes to the code are minor and have little or no effect on code stringency.

Duct insulation requirements have changed from the R-5 or R-3.3 required in the 2000 IECC. In the 2003 code, duct insulation levels are set based on heating degree-days (hdd), duct location, and duct type (supply or return). Supply and return ducts in attics are generally required to have R-8 and R-4 insulation, respectively. Ducts in other unconditioned spaces such as basements, crawlspaces, and garages generally have requirements of R-4 to R-8 for supply ducts and R-2 for return ducts.

A special set of requirements has been added to the code for sunroom additions. Sunroom additions are permitted to have ceiling, wall insulation, and window U-factor requirements typically less stringent than the requirements for all other types of residential construction. To qualify, the sunroom addition must

- Be capable of being controlled as a separate zone.
- Meet the envelope requirements of the IECC for any new walls, doors, or windows between the sunspace and the house.
- Have the glazing area be in excess of 40% of the gross area of the exterior walls and roof of the sunroom.

Requirements tables were added for steel-frame ceilings and floors that complement already existing IECC steel wall requirements. Providing simple methods of complying with steel-framed building codes, these tables are intended to provide requirements equivalent in energy efficiency to those already in the code for wood-framed ceilings and floors.

The performance path in Chapter 4 of the IECC contains a variety of modest improvements that make the chapter simpler and briefer. For example, unnecessary text about crediting renewable energy has been deleted. Other changes enhance the accuracy or completeness of the requirements or make them more sensible (e.g., internal heat gain assumptions improved).

There are two changes that can increase the stringency of the code in certain cases. First, any house proposed to use electric resistance heating must be compared against the "standard design" having an electric air source heat pump. This change makes the performance approach more stringent for electric resistance heating designs. Second, a provision has been added that the worst possible orientation, in terms of energy use, be assumed for a group of residences in a development with identical designs.

An additional change allows climate zones identified in Chapter 3 to now be used with the prescriptive envelope requirements in Chapter 6 and Section 502.2.4 of the code. These prescriptive tables can be used with either the hdd or the Chapter 3 climate zone maps, whereas in the 2000 IECC, only hdd could be used. For most locations, the Chapter 3 climate zones and hdd lead to the same envelope requirements. Using the climate map zones in the maps instead of the hdd will allow about 10% of cities nationwide to have less stringent prescriptive requirements. However, about 20% of cities nationwide will have more stringent requirements when the climate zones are used with the prescriptive requirements. This change brings consistency between the IECC, the International Residential Code, and the **RES*check*™** compliance materials developed by the U.S. Department of Energy. **RES*check*** has always used the map-based climate zones for its prescriptive requirements.

Many of the changes to the IECC are intended to improve code wording. Definitions have been added, and some terminology has changed. Residential building definitions were revised to better align with the IRC and International Mechanical Code definitions. The A-1 and A-2 residential designations are no longer used—they have been replaced with the R-2 and R-4 classifications from the International Building Code (IBC) and the term "detached one- and two-family dwellings."

To obtain a copy of the 2003 IECC, go to **www.icc.org**.

Crawlspace Ventilation

Does the Energy Code Allow an Unvented Crawlspace?

Yes. Although historically, some codes have included ventilation requirements for crawlspaces in homes, the energy code does allow both vented and unvented crawlspaces. For either type of crawlspace, you should be aware of some code requirements (2000 I-codes):

Vented Crawlspaces: Code Requirements	Unvented Crawlspaces: Code Requirements
• The raised floor over the crawlspace must be insulated to the code R-value requirements for floors *(varies by location)*. • A vapor retarder may be required as part of the floor assembly *(varies by location)*. • Ventilation openings must exist that are equal to at least 1 square foot for each 150 square feet of crawlspace area and be placed to provide cross-flow *(IRC 408.1, may be less if ground vapor retarder is installed)*. • Unconditioned crawlspace ducts must be sealed and meet R-value insulation requirements *(IECC Table 503.3.3.3)* – usually R-5.	• The crawlspace ground surface must be covered with an approved vapor retarder *(e.g., plastic sheeting)*. • Crawlspace walls must be insulated to the R-value requirements specific for crawlspace walls *(IECC 602.1.7, 502.2.1.5, and Table 602.1)*. • Crawlspace wall insulation must extend from the top of the wall to the inside finished grade. • Crawlspaces must be mechanically vented *(1 cfm per 50 square feet)* or conditioned *(heated and cooled as part of the building envelope)*.

If you live in a region with a different set of codes, check with your local code official to determine the code requirements for crawlspace ventilation in your area.

A good option for many homes today is building an unventilated and conditioned crawlspace, as this technique can reduce duct losses, keep moisture out, and may reduce construction costs. For more information about building an unvented and conditioned crawlspace, see the 2000 DOE Technology Fact Sheet on crawlspace insulation at **http://www.eere.energy.gov/buildings/documents/pdfs/29238.pdf**.

Building Energy Codes Workshop

June 23-26, 2003 ■ Atlanta, GA

This year's workshop is going to be the event of the year for energy code professionals around the country. The agenda features several new and exciting topics that address the latest issues in building energy codes.

Can't make it to the workshop? Presentations from the individual seminars will be available online approximately one week after the event.

Visit **www.energycodes.gov/news/2003_workshop/** to get the latest details.

Monday, June 23rd

Pre-Workshop Morning Session:
Building Tours
Technology Square, Atlantic Station,
Emory University, Southface Energy Institute

Afternoon Session:
Presentations
• Energy Codes 101
• HVAC 101
• ASHRAE 90.1-2001

Suspended Ceilings and the Energy Code

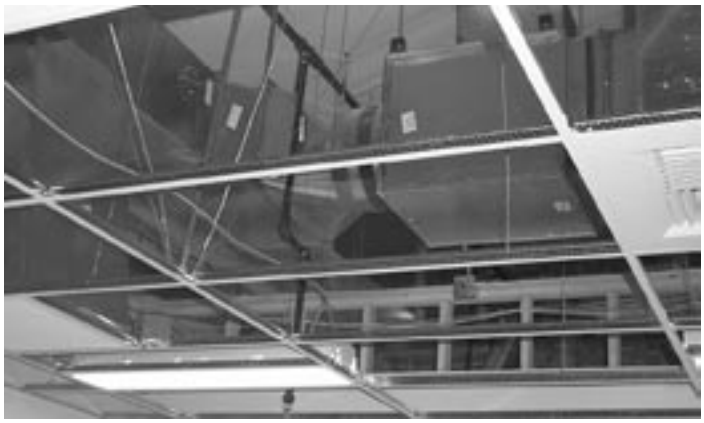
Does Insulation Draped Above the Suspended Ceiling Satisfy Energy Code Requirements?

No. Insulation installed in a suspended ceiling does not meet the infiltration requirements of the International Energy Conservation Code (IECC). When the insulation is on the suspended ceiling, the ceiling is defined as part of the building envelope. This requires that it be air-sealed like any other envelope component:

> **IECC, Section 802.3.2 Sealing the Building Envelope:** *Openings and penetrations in the building envelope shall be sealed with caulking materials or closed with gasketing systems compatible with the construction materials and location. Joints and seams shall be sealed in the same manner or taped or covered with a moisture vapor-permeable wrapping material. Sealing materials spanning joints between construction materials shall allow for expansion and contraction of the construction material.*

ASHRAE 90.1-1999 also prohibits the insulated suspended ceiling from being part of the building thermal envelope for compliance (Section 5.2.1.4).

> **ASHRAE 90.1-1999, Section 5.2.1.4 Location of Roof Insulation:** *The roof insulation shall not be installed on a suspended ceiling with removable ceiling panels.*



What can be done to meet code?

Insulate and seal the exterior roof and show compliance with the roof assembly as part of the building envelope component. The drop-down ceiling can remain as an interior ceiling, but no credit will be given for batt insulation draped above the suspended ceiling.

How can I show compliance for an office space within a warehouse?

If the warehouse is heated only to prevent freezing or is considered an unconditioned space, the office should be treated as a "building within a building." This means the ceiling of the office space would be part of the "building within a building" envelope and should be insulated and sealed as described above. Interior walls (walls separating the office from the warehouse only) and exterior walls of the office space also will require insulation and sealing.

Tuesday, June 24th	Wednesday, June 25th	Thursday, June 26th
Plenary: Whose Code Is It, Anyway?	**Plenary:** Web-Based Energy Codes Training – The Next Step?	**Cracker Barrel** *Pick your three favorite energy code topics*
1A: Building Science and the Code: Moisture Control	**3A:** Living Better with Energy-Efficient Windows	**5A:** Code Implications of the Latest & Greatest in Building Mechanical Technologies
1B: How Can We Work Together? (Part 1)	**3B:** How Can We Work Together? (Part 2)	**5B:** RES*check*™ Hands-On Software Training
2A: Building Science and the Code: Code Barriers	**4A:** The Plight of Energy Codes in Home Rule States	*Post Workshop Session:* **U.S. Department of Energy's Proposed Code Change**
2B: Beyond Compliance	**4B:** Proposals for Code Grants	

Site-Built & Curtain Wall Glazing Systems

How do I show energy code compliance for site-constructed glazing systems?

Compliance for site-built glazing systems is comparable to other assemblies within the building envelope but can be challenging because documentation on glazing performance values—U-factor, Solar Heat Gain Coefficient (SHGC), etc.—is not usually available. Without documentation, default values from the code may be used, but these values assume the worst in terms of thermal performance and often present code compliance challenges. Default values can be taken from tables in Chapter 1 of the IECC, Appendix A of ASHRAE 90.1-1999 or 2001, or by right-clicking on the appropriate cell in the **COM*check-EZ*™** software.

The National Fenestration Rating Council (NFRC) also has a rating program for site-built windows. See **http://www.nfrc.org/sb_outline.html** for more information. If the site-built glazing used in your project has been rated through this program, the performance ratings can be used for energy code compliance.

Code compliance challenges can be alleviated somewhat if glazing overhangs that provide significant shading are used. Overhangs must be a permanent part of the building, however, before the credits can be applied. The projection factor (PF) will determine how much credit will be given. See Figure 1.

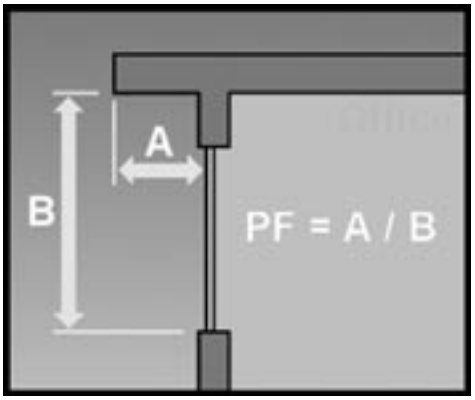


Figure 1: Determining Overhang Projection Factor (PF)

The PF is calculated by measuring the distance from the edge of the overhang to the window (A) and dividing that distance by the distance from the bottom of the window to the lowest point of the overhang (B).

How do I show compliance for a curtain wall system when I have assembly performance data from the manufacturer?

If the wall assembly is essentially all glazing, the easiest way to show compliance for these systems is to use the **COM*check-EZ*** software, Version 2.4 Release 2c or later,* following the steps below.

Within the "Envelope" tab, enter an exterior wall and window for each curtain wall:

1) Create Exterior Wall

- Select "Ext. Wall" and choose "Other"** as the assembly type from the drop-down menu.
- Enter the total square footage for the entire assembly (including the framing—the framing area should be less than 10% of the gross area of the wall).
- Enter the U-factor from the manufacturer for the entire assembly.

2) Enter Window

- Select "Window" and choose "Other" as the assembly type from the drop-down menu.
- Enter the estimated square footage of the glazing. This number should be greater than 90% of the total square footage of the entire assembly.
- Enter the U-factor and SHGC from the manufacturer for the entire assembly. Enter PF, if applicable. The software accepts PF values from 0.0 to 1.0. However, for all 90.1-1989 based codes, the PF ratio credits are limited to 0.5.

* To download the most recent version of Comcheck-EZ (2.4 Release 2c), go to **www.energycodes.gov/comcheck/ez_download.stm**.

** The Georgia Energy Code does not allow the use of the "other" category for envelope assemblies. Please see your local code official for other compliance options.

Are there other specific software or code related questions you would like to have answered in the next issue of *Setting the Standard*? Please send your suggestions via e-mail to **sts@becp.pnl.gov**.

BUILDING ENERGY CODES

Calendar

JUNE 2003

23-26 **2003 National Workshop on State Building Energy Codes**
Sheraton Atlanta Hotel – Atlanta, GA
http://www.energycodes.gov/news/2003_workshop/

27 **ASHRAE Standard 90.1 Train-the-Trainer Course**
Westin Crown Center Hotel – Kansas City, MO
http://www.ashrae.org/

27-1 **BOMA 96th Annual Convention & Office Building Show**
San Francisco Marriott & Moscone Center – San Francisco, CA
http://www.boma.org/convention/

28-2 **ASHRAE 2003 Annual Meeting**
Westin Crown Center Hotel – Kansas City, MO
http://xp20.ashrae.org/frame.asp?MEET/KC-MeetMenu.htm

JULY 2003

24-26 **2003 Southeast Building Conference**
Rosen Centre Hotel – Orlando, FL
http://www.sebcshow.com/att_reghotel.htm

29-1 **2003 ACEEE Summer Study on Energy Efficiency**
Hilton Ryetown – Rye Brook, NY
http://www.aceee.org/conf/03ss/03ssindex.htm

AUGUST 2003

17-20 **2003 Energy Workshop and Exposition**
Wyndham Palace Resort and Spa – Lake Buena Vista, FL
http://www.energy2003.ee.doe.gov/

SEPTEMBER 2003

5-14 **ICC's 2003 Codes Forum**
Gaylord Opryland Hotel – Nashville, TN
http://www.iccsafe.org/conference/forum2003.htm

6-7 **ICC's Expo 2003**
Gaylord Opryland Resort & Convention Center – Nashville, TN
http://www.iccsafe.org/conference/expo0203.pdf

14-17 **NASEO 2003 Annual Meeting**
Hyatt Regency at Town Lake – Austin, TX
http://www.naseo.org/events/annual/

25-27 **JLC Live Residential Construction Show**
Greater Columbus Convention Center – Columbus, OH
http://www.jlclive.com/columbus.asp

Setting the Standard is published by the Building Energy Codes Program of the U.S. Department of Energy Office of Energy Efficiencey and Renewable Energy at the Pacific Northwest National Laboratory. Its purpose is to encourage information exchange among building industry professionals and organizations, state and local code officials, and researchers to facilitate timely development and early adoption of the building energy conservation standards. Send comments and contributions to Pam Cole at Pacific Northwest National Laboratory (pam.cole@pnl.gov).

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Internet: **http://www.energycodes.gov**

June 2003 DOE/GO-10099-702

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste.

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