

Frequently Asked Questions (FAQ) – Module III

General:

Q: Will there be continued energy code training once the stimulus money is gone?

A: Colorado Chapter of ICC will continue to provide training. The Governor's Energy Office is continuing to seek ways to offer more training. Xcel Energy is piloting a program to offer training for people in their service area. The tool kit at www.colorado.gov/energy codes will provide online classes and many training tools can be found at the Department of Energy's website at www.energycodes.gov.

Q: Do I need to install ceiling insulation in older buildings?

A: The IECC does require existing buildings to be brought up to code if there is an alteration to that portion of the building. That being said, there is an exemption for historic buildings and for buildings where you don't expose the cavity. One thing to keep in mind is the actual design of the snow load of that building because older designs that didn't have insulation were not designed to a high snow load because the snow melted. If we put insulation in them now, there may be the need to get an engineer involved to assess if the roof will now hold the snow load.

Q: When do I have to use the default values for fenestrations?

A: When I am unable to verify by labels or testing what the u-values of windows will be.

Q: When can I use UL181 tape?

A: Per the listing of UL181 tape it is listed for flex to flex or flex to metal duct connections but not for metal to metal duct connections. This is an ongoing issue for this tape and they are working on it, but as of now, it still may not be used for metal to metal connections.

Q: Is there a difference between a residential above-grade wall and a commercial above-grade wall?

A: Yes. The definitions for an above grade wall was actually meant for residential only and calls an above grade wall any wall that is 50% or more above grade. In the commercial chapter, in 502.2.2.1, an above grade wall for commercial is any wall that is more than 15% above grade. That is a big difference, so be sure to use the commercial section for commercial above grade walls.

Q: How do you convert watts to btu's?

A: Here is a link to a handy website that does those conversions for you:
<http://www.unitconversion.org/power/watts-to-btus-it--per-hour-conversion.html>

Residential:

Q: In ResCheck, how do you determine whether it is continuous or cavity insulation?

A: Continuous insulation is insulation installed without being broken up by framing members. An example would be draped insulation in a basement or rigid foam insulation. Cavity insulation is insulation that is installed within a framing cavity; Batt insulation or insulation blown in to a cavity. In ResCheck when calculating ceiling insulation, the Department of Energy has stated that even with blown in insulation, if any of the insulation is installed in a cavity, then the entire amount must be considered cavity for purposes of entering insulation values into the program. For ceilings on ResCheck, you should not see an amount in the cavity column AND the continuous column.

Q: Section 402.4.3 requires new, wood-burning fireplaces to have gasketed doors. What is the intent of this provision?

A: To be clear, Section 402.4.3 addresses “wood-burning fireplaces,” as derived from Code Change EC64-07/08, Part I (**AM**). In the supporting reason to this proposal, the conditions for adding the language were to address concerns for energy savings derived from the minimizing air leakage during periods of non-use and indoor air quality concerns.

Since certain UL-127 “factory-built” fireplaces are listed and labeled to burn wood, and the installation of gaskets would violate conditions of their listing; we interpret this to mean “masonry fireplaces” constructed in accordance with the *International Building Code*—Section 2111, and NOT “factory-built” fireplaces manufactured in accordance with the *International Mechanical Code*—Section 903. Our rationale is derived from the confusion with respect to requirements for “gasketed doors.”

Worth noting here, is that there are numerous ways to minimize air leakage through the fireplace during periods of non-use without requiring gasketed doors. For example, there are several low emission units considered part of the EPA [Cleaner Burning Fireplace Program](#) which are “tightly sealed,” yet do not utilize gasketed doors.

Accordingly, and solely for “factory-built fireplaces,” we recommend pursuing relief from the proviso for “gasketed doors” administratively vis-à-vis IECC Sections 101.3 (“... this code is not intended to abridge safety ... requirements contained in other applicable codes or ordinances.”) and 102.1 (“... provided that such construction [or] design ... has been *approved* by the *code official* as meeting the intent of this code.”). (2009 IECC 402.4.3)

Q: Work proposed to a home consists of replacing existing window units in their entirety. Currently we do not require permits for window replacements. How do others interpret or enforce window replacements?

A: The 2009 IECC considers window replacements *alterations* to the building. Yet for some time, many municipalities have considered the replacement window issue a matter of jurisdictional choice by way of a jurisdiction’s unique adopting ordinance; most often reading, “If it fits into the same opening, then you do not need to obtain a building permit. Where the new window size is different than the size of the opening, a permit application is required.”

To be code compliant however, *all* window replacements, as *alterations*, require a permit in accordance with the IECC. Jurisdictions under the 2009 IECC will need to perform compliance assessment for residential buildings, and thereby inspect and verify fenestration thermal performance (U-factor and Air leakage) for homeowners in their communities. Documentation shall be provided with the permit application indicating that the replacement window products afford a fenestration U-factor no greater than required by the IECC. This will take some extra

public relations and communications to get the word out for the new permit requirement; a perfect opportunity for [Building Safety Month](#).

Q: If you put in a permanent heater into the garage does it have to meet the thermal envelope requirements?

A: Indeed. Once the input capacity of the heater (or unit heater) exceeds 3.4 Btu/h · ft² (1.0 W/ft²) of floor area, the space, in this case the garage, is considered "conditioned." Therefore, the surrounding walls, windows, doors, overhead doors, roof, and slab-edge become the boundary of the building thermal envelope and must be insulated. Note also that the air-leakage requirements of the code apply to the enclosing doors and windows as well. (2009 IECC 101.5.2, 202 – BUILDING THERMAL ENVELOPE, CONDITIONED SPACE)

Q: Where did provisions for moisture control go? Our community requires the use of a vapor retarder in framed-walls. Acceptable retarders include polyethylene and kraft-paper. Please clarify the moisture control requirements of the 2009 IECC?

A: The 2009 IECC no longer contains provisions for moisture control. Final action to Code Change EC28-06/07 (AM), resulted in identifying and defining vapor retarder materials by Class. Consequently, the 2009 *International Residential Code*[®] (IRC[®]) now recognizes that wall assemblies can be designed and constructed to dry inwards and outwards under particular conditions. The moisture control provisions have been relocated to Section 1405.3 of the 2009 *International Building Code*[®] (IBC[®]) for commercial buildings and Section R601.3 of the IRC for residential buildings. Based on these revised and improved provisions, it is not likely homes constructed in Illinois will require kraft-paper, foil-facings, or even polyethylene vapor retarders any more. Please consult the provisions of IRC R601.3 directly for additional detail.

Where kraft-paper and foil-facing (**Class I**) vapor retarders, or polyethylene (**Class II**) vapor retarders are proposed in lieu of latex or enamel paint (**Class III**), the installation of these vapor retarders shall be continuous over the wall field. Therefore, in order to maintain continuity of the vapor retarder, it would mean the kraft-facings would need to be face-stapled to meet the requirements of R601.3. In addition to restricting water vapor diffusion, the installation of a vapor retarder impedes airflow, provided that it is continuous. Where openings are left in the vapor retarder during installation, either intentionally or by accident, they nullify the control of airflow, and therefore, the flow of moisture.

To summarize, there exist three distinct provisions addressing moisture control and weather resistance for exterior walls in the IECC/IRC, accompanied by a distinct performance requirement:

- (1) A water-resistive barrier shall be installed in accordance with IRC Section R703.2 and Table R703.4, and the manufacturer's installation instructions (IRC R106.1.2); and
- (2) A **Class I**, **Class II**, or **Class III** vapor retarder shall be installed in accordance with IRC Section R601.3 and Table 601.3.1, and the manufacturer's installation instructions (IRC R106.1.2); and
- (3) The *building thermal envelope* shall be durably sealed to limit infiltration either by;

- a. The installation of caulk, gaskets, and weather-stripping in accordance with IECC Section 402.4.1, the manufacturer's installation instructions (IECC 303.2), and Table 402.4 by visual inspection or testing; **OR** by
- b. The installation of an *air barrier* installed in accordance with IECC Section 402.4.1, the manufacturer's installation instructions (IECC 303.2), and Table 402.4.2 by visual inspection or building diagnostic testing.

Typically, the IECC's requirement described in (3b) can be accomplished by meeting the IRC requirement described in (1) above. (2009 IECC, 2006 IRC vs. 2009 IRC 601.3, 2009 IBC 1405.3 - Vapor Retarders)

Q: Could you please clarify the intent of the code regarding the use of supplemental R-2 insulating sheathing referenced in Table 402.1.1, Footnote 'h'?

A: Table 402.1.1, Footnote 'h' is permitted **only** for circumstances where structural requirements for the building design dictate the use of structural sheathing over more than 25 percent of the exterior in accordance with the *International Residential Code*[®] (IRC[®]). IECC Footnote 'h' is not an elective, rather an accommodation, where for practical reasons (i.e., maintaining IRC structural bracing requirements), an insulated sheathing level of **at least** R-2 is permitted to be substituted for the minimum required insulated sheathing level of R-5. Note the R-13 level of insulation required for wall cavities in accordance with Table 402.1.1 remains for Climate Zones Marine 4, 5 and 6.

Q: In climate zone 5, why did they change from R-19 to R-20 and not go to R-21?

A: At the code hearings, there was a blown in insulation manufacturer present who had a product that couldn't quite make the R21 value in a 2 x 6 cavity so going to R-21 would have left that manufacturer out of the market. Therefore, it was decided to make the requirement R-20. You can use an R-21 high density batt or any blown in or sprayed manufacturer who has a product that can meet the requirement.

Q: Section 402.2.1 allows a trade-off for lesser ceiling insulation if the insulation is not compressed over the top of the exterior wall (at the eaves). Is the lesser value allowed for the entire ceiling?

A: Yes. Knowing that insulation gets compressed at the eaves for the whole perimeter of the roof, the code requirement for R-value was raised but if you don't compress it at the eaves, you are allowed to use the lower R-value per that section of the code. The intent on this section was that the entire ceiling gets the lower R-value, not just the area around the perimeter. There are certain instances where a HERS rater may only allow the reduced R-value around the perimeter, but that is **ONLY** if you are going the performance path.

Q: When can I use UL181 tape?

A: Per the listing of UL181 tape it is listed for flex to flex or flex to metal duct connections but not for metal to metal duct connections. This is an ongoing issue for this tape and they are working on it, but as of now, it still may not be used for metal to metal connections.

Commercial:

Q: Please explain how to use different wattage luminaires and comply with the code.

A: For example, does my lighting comply, if my building that is using a Halo H71CT 6” ceiling insulated Recessed Housing which accepts a R-30 type bulb, the bulb specified is a “15 Watt CFL, Light Bulb - 65 W Equal-Warm White 27000K - R30 Reflector – Energy Miser FE-R30-15W-27k”, can this information be input into the COMcheck™ Compliance Software as 15 Watt CFL, instead of a 65 Watt incandescent to show that it is in compliance?

□ The 2006 IECC requires that screw-based luminaires be counted for compliance based on the rated wattage of the luminaire. The basis for this requirement is that after occupancy and initial lamp burnout, any wattage lamp could be put in and the maximum luminaire wattage rating most reasonably represents true lighting application. This can make compliance difficult if a lower wattage lamp is intended to be used. This is why some designers contract with manufacturers to label luminaires with a lower wattage rating that ensures that future lamp replacements are limited to this maximum wattage. COMcheck™ is a tool that follows the adopted codes; therefore, the labeled wattage of the luminaire is the appropriate input for code compliance and the COMcheck™ tool.

Q: A metal building roof is proposed using batten insulation lapping over purlins and girts. The insulation is compressed at all girts and purlins so R-values will be significantly less at these locations. Are the values specified for “Metal Building Roofs” intended to be maximums, minimums or averages?

A: Often referred to in the industry as “trough-fastened” or “screw-down” metal roofing, a complying prescriptive option no longer exists in the 2009 IECC where the batten insulation is simply draped over purlins and then compressed as the metal purlins (spanning members) are attached. The 2009 IECC now addresses this matter by requiring all metal building roof systems to be provided with thermal blocks.

Thermal blocks in metal building construction reduce direct contact between metal roof panels and the purlins, thereby increasing the thermal performance of the roof insulation system as a whole. These blocks are placed on top of the insulation at the structural members and may be temporarily held in place with double-faced tape, spray adhesive, or clips until the roofing panels are put on. The code requires only that these thermal blocks provide an insulation level equivalent to R-5 (see Table 502.2(1) Footnote ‘a’).

Simply put, a metal building roof complies with the 2009 IECC where the battens are installed along with R-5 thermal blocks as described in Table 502.2(2). No area-weighted averaging, effective averaging, or averaging of any kind is permitted.

While somewhat dated, the NAIMA *Compliance Guide for Metal Buildings* (MB304) provides additional detail for typical metal building construction assemblies, and may be found at the following URL: <http://www.naima.org/pages/products/mb.html>. [2009 IECC Table 502.2(1)]

Q: Are commercial ducts located in the interstitial space between an insulated roof and suspended ceiling cavity required to be insulated to R-5 where design temperature differences exceed 15°F (18C) in accordance with Section 503.2.7, Exception 2?

A: No. Ducts located completely within the conditioned space (i.e., the interstitial space between the roof and a suspended ceiling) or between two conditioned spaces (i.e., the interstitial space between conditioned floors), where design temperature differences exceed 15°F (18C) are required to be insulated, but not to the level of R-5. This answer is based on a determination of what constitutes conditioned space as well as some perspective provided by Federal Trade Commission (FTC) *R-value* Rule [16 CFR Part 460]. (2009 IECC 303.1.4)

First, a conditioned space is any space that does not communicate directly to the outside and that meets one of the following criteria:

- The space has a heating or cooling supply register;
- The space has heating or cooling equipment designed to heat or cool the space;
- The space contains uninsulated ducts, uninsulated supply diffusers or uninsulated hydronic heating surfaces (and therefore considered indirectly conditioned); or
- The space is located inside the building thermal envelope.

Ducts located in the interstitial space between insulated roof deck and a suspended ceiling, or between conditioned floors are located *inside* the building thermal envelope. However, certain minimum insulation levels in the code have roots not in energy conservation, but rather in the interest of protecting the building structure. See also 16 CFR Part 460, commonly referred to as the “*R-value* Rule” (http://www.ftc.gov/os/1999/08/rvaluefr.htm#N_3).

The reference to a 15°F (18C) temperature difference in Section 503.2.7, Exception 2, stands only to remind the designer that certain minimum insulation levels, chosen at the discretion of the designer, are required primarily to protect the building structure, fit and finish from the effects of condensation, rather than to reduce energy losses in ducts. (2009 IECC 503.2.7)

Q: In a strip shopping center (multiple tenants), is it “building area” or “individual tenant space area” which determines whether automatic building lighting shutoff controls are required in accordance with 2009 IECC Section 505.2.2.2?

A: Tenant spaces are not “buildings.” The provisions of Section 505.2.2.2 apply where the “building area” of the strip shopping center exceeds 5,000 ft², as defined by the *International Building Code*®. Automatic “building lighting shutoff” controls must be able to accommodate separate schedules for each floor or tenant of the building up to a maximum of 25,000 square feet per control, whether the tenants are arranged vertically or horizontally.

The application of Section 505.2.2.2 is especially important for multi-tenant buildings where each tenant may keep different business hours. In a strip shopping center for instance, a bank or tax branch office operates for different hours on weekdays, Saturdays, Sunday, and holidays. Restaurants may be open late on Friday and Saturday nights, but closed on other days. Some retail stores may be open for the same hours every day of the year, whereas other retail stores may operate independently.

Q: Is daylight harvesting and thereby, daylight zone control required by the 2009 IECC or optional?

A: Optional, There exists no “charging language” in the 2009 IECC requiring daylight harvesting. Rather, Section 505.2.2.3 exists such that when DAYLIGHT ZONES (See Section 202) are specified for a facility, they are provided with controls as outlined in Section 505.2.2.3.

Note also, that resulting from final action to Code Change EC173-09/10 (AM PC1), the 2012 Edition of the IECC will have minimum daylight harvesting requirements for certain spaces as described: A minimum required skylight area to daylight zone area will be required for certain spaces >10,000 ft² (929 m²) and with ceiling heights >15 feet (4.57 m), to provide a total daylight zone under skylights no less than half of the floor area. Spaces meeting the aforementioned criteria and used as an office, lobby, atrium, concourse, corridor, storage, gymnasium/exercise center, convention center, automotive service, manufacturing, non-refrigerated warehouse, retail store, distribution/sorting area, transportation or workshop; will be required to provide daylight harvesting. Specific exceptions, including buildings located in Climate Zones 6 through 8, apply. (2009 IECC 505.2.2.3)

Q: Does the code require at least one manual lighting control (e.g., a switch or pull-chain) for each area enclosed by floor-to-ceiling height partitions?

A: No, Users of the IECC may choose their own path to compliance based on the circumstances and the owner’s project requirements: either Compliance with IECC Chapter 5 (in its entirety), or Compliance with ASHRAE Standard 90.1-2007 (in its entirety).

Specific to lighting controls, manual lighting controls are required by the IECC (Section 505.2.1, “... shall have at least one manual control ...”). Manual lighting controls are not required by Standard 90.1-2007 (Section 9.4.1.2, “... shall have at least one control device...”). The 90.1 Standard does not specify whether the control device need be manual or automatic.

Note additionally, that Standard 90.1 Section 9.4.1.2(a), goes on to list specific locations where automatic lighting controls are required (in lieu of manual switching) that turn off the lighting within 30 minutes of all occupants leaving in:

- Classrooms (not including shop classrooms, laboratory classrooms, and preschool through 12th grade classrooms);
- Conference/meeting rooms; and
- Employee lunch and break rooms.

(2009 IECC 505.2.1, 90.1-2007 9.4.1.2)

Q: A major energy company has what they call “Global Facility Practices” which define features that must be constructed in all of its facilities. In the case of “Laboratories designated for Experimental Research,” it requires 75 foot-candles (initial) and 50 foot-candles (in-service) at 30-inches above finish floor. The lighting design which produces 75 foot-candles exceeds that allowed by the 2009 IECC. The 2009 IECC does not have a “Laboratory” building

description under Table 505.5.2. What lighting power density (LPD) is appropriate to accomplish the owner's project requirements while still complying with IECC?

A: Corporate practices for constructing facilities do not usurp the model construction codes cited in state law or municipal statute. In the case of laboratory lighting, be it designated for research or experimental use, the 2009 IECC affords the applicant the choice of two paths to compliance: 1) the provisions of IECC Chapter 5 in its entirety, and the lighting provisions therein, or 2) the provisions of ASHRAE Standard 90.1 in its entirety, and the lighting provisions therein.

By way of IECC Pathway 1) above, indeed, use of the LPD assigned to a "Workshop" at 1.4 W/ft² could be deemed equivalent in form and function to a laboratory setting. While there exists an exemption in Section 505.5.1 for "Specialized medical, dental and research lighting," the exception does not apply to "**general ambient**" lighting, but more specifically to the "**equipment used for the research application**," (**emphasis** added). Moreover, task lighting that is not "hard-wired" to the building electrical systems (i.e., plug-in lamps or lighting integral to research equipment) is not regulated by the code.

To accomplish the owner's project requirements in this case, the lighting design professional might consider compliance assessment using the Standard 90.1-2007 Pathway 2) above, whereby Table 9.6.1 of the Standard assigns a "Laboratory" LPD of 1.4 W/ft² to the space. Moreover, bear in mind that the "Space-by-Space" methodology affords up to 10 percent additional connected lighting power to the lighting design professional which can be apportioned throughout the facility as desired. Put another way, there may be some spaces in the research facility that are "under-budget" and still others that are "over-budget," but overall, the entire research facility uses no more connected lighting power than budgeted by the Space-by-Space method described in Standard 90.1, Section 9.6.

Q: Do the last IECC versions reference the ASHRAE Standard in such a way as to require the commissioning work described in them?

A: ASHRAE Standards 90.1-2004 and 90.1-2007 require plans and specs to include detail descriptions for commissioning of HVAC systems and their controls in buildings with conditioned space greater than 50,000 square feet.

□ The 2009 IECC allows a code user to use either 90.1-2007 in its entirety (including the HVAC requirements) or to use the requirements in Chapter 5 of the 2009 IECC. Chapter 5 of the 2009 IECC does not have any specific commissioning requirements. There are air system and hydronic system balancing requirements, but nothing specifically labeled "commissioning" or "functional testing". Commissioning requirements have been proposed for the IECC before and will be discussed for the 2012 IECC.

Q: How do you evaluate u-value for store front glazing?

A: The energy code does not allow us to use center of glass u-value. U-value for all buildings is calculated for the whole assembly, including frame, sash, thermal breaks, etc. Because this type of glazing does not come with labels, it becomes necessary for NFRC to either test the glazing or you can use the CMA program to determine compliance based on the different components.

Q: What's the difference between tradable and non-tradable surface areas on commercial buildings for lighting?

A: Tradable surfaces are surfaces where if you don't use all the lighting allowed on one of the surfaces you can use the left over on another one of the tradable surfaces. Example: I don't use all my parking lighting so I can use it for my canopy. Non-tradable surfaces are allowed a certain amount of lighting and you cannot use the excess somewhere else nor can you use excess from somewhere else on these surfaces.