

## ***Illinois Energy Conservation Code Training and Support Program Frequently Asked Questions***

### **SCOPING FOR APPLICABILITY – Chapters 1, 2, 3**

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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 Illinois 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."

With the onset of energy efficiency requirements for residential buildings effective January 29, 2010, *all* window replacements, as *alterations*, require a permit in accordance with the IECC. Jurisdictions subject to the *Illinois Energy Efficient Building Act* will use the 2009 IECC to perform compliance assessment for both residential buildings, and thereby to inspect and verify fenestration thermal performance (U-factor, Solar Heat Gain Coefficient 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 and SHGC 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](#).

Section 600.110, Part c) 2) of the Act, *Privately Funded Commercial Facilities and Residential Buildings*, reads:

"The Code as [2009 IECC] described in Subparts C [Privately Funded Commercial Facilities] and D [Residential Building] of this Part applies to **any new building or structure** in this State **for which a building permit application is received** by a municipality or county. [20 ILCS 3125/20]

- A) Additions, **alterations**, renovations or repairs to an existing building, building system or portion thereof **shall conform to the provisions of the Code [2009 IECC] as they relate to new construction** without requiring the unaltered portion of the existing building or building system to comply with the Code [2009 IECC]. [20 ILCS 3125/20(c)]
- B) **All exceptions listed in the Code [2009 IECC] related to** additions, **alterations**, renovations or repairs to an existing building **are acceptable** provided the energy use of the building is not increased.

[**Emphasis** intended] (2009 IECC 101.4.2, 101.4.3)

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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 · ft<sup>2</sup> (1.0 W/ ft<sup>2</sup>) 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)

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Q: Our legal department has determined that since we have adopted by reference the 2006 IECC before May, 2009 our jurisdiction is not required to enforce the 2009 IECC for residential construction.

A: On issues pertaining to the provisions of the [Illinois Energy Efficient Building Act](#) [20 ILCS 3125] specific to *Home rule* communities, please note the language excerpted from the Act [20 ILCS 3125/45(b)], addressing *Home rule units*, "... the following entities may regulate energy efficient building standards for residential buildings in a manner that is **more stringent than** the provisions contained in this Act." [**Emphasis** intended].

Therefore, the jurisdiction could elect to enforce a residential energy code locally; in a manner that is **more stringent than** the residential provisions of the 2009 IECC, but only if the jurisdiction had adopted the 2006 IECC on or before May 15, 2009. Alternatively, the provisions of the 2009 IECC for residential buildings are to be enforced at a minimum, in accordance with the Act. Put another way, the 2009 IECC represents a minimum standard.

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Q: If a wood-framed wall of a residential building is being re-insulated, what is the minimum required R-value based on our Climate Zone 5A? This is not for the whole wall assembly; the scope of work simply consists of removing and replacing wall cavity insulation and then applying an interior drywall finish.

A: The work constitutes an "alteration" as outlined in Section 101.4.3, Exception 3, requiring replacement with insulation having a density of at least R-3/inch. Note that many of the exceptions outlined in Section 101.4.3 are derivations, in whole or in part, from language appearing in ASHRAE Standard 90.1-2007. In particular, note Section 5.1.3(c) of the Standard. [2009 IECC 101.4.3, 90.1-2007 5.1.3(c)]

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Q: Municipalities have raised the question, "How do we know whether or not Architectural Energy Corporation's **REM/Rate™** software is acceptable for performing the requisite residential calculations essential to IECC compliance? And whether the results are acceptable?"

A: The [Illinois Energy Efficient Building Act](#) [20 ILCS 3125] provides three methods for submitting a Residential design for compliance assessment to the Act:

**Section 600.430 Compliance**

- a) Compliance with the Illinois Energy Conservation Code as described by this Subpart D (applicable to residential buildings) shall be determined by the local authority having jurisdiction (AHJ).
- b) Minimum compliance shall be demonstrated by submission of:
  - 1) Compliance Certificates generated by the U.S. Department of Energy's REScheck™ code compliance tool; or
  - 2) Other comparable compliance materials that meet or exceed, as determined by the authority having jurisdiction, the U.S. Department of Energy's REScheck™ code compliance tool; or

- 3) The seal of the architect/engineer as required by Section 14 of the Illinois Architecture Practice Act [225 ILCS 305], Section 12 of the Structural Engineering Licensing Act [225 ILCS 340] and Section 14 of the Illinois Professional Engineering Practice Act [225 ILCS 325].

If the **REM/Rate™** software is determined to be “... comparable compliance materials ...” so determined by the authority having jurisdiction, can be considered “deemed to comply” with the *Illinois Energy Conservation Code* and the provisions of the 2009 IECC referenced therein by the Simulated Performance Alternative (2009 IECC 405).

The 2009 *International Energy Conservation Code®* (“IECC®”) is a registered trademark of the International Code Council, Inc. (“ICC®”). No version of the REM/Rate™ software has been reviewed or approved by ICC or its affiliates. (2009 IECC 103.1)

## RESIDENTIAL, Chapter 4

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Q: Am I required to utilize diagnostic testing for assessing compliance with the 2009 IECC for home air leakage?

A: No, There are two options for assessing compliance with the home air leakage requirements of the 2009 IECC: 1) a rigorous visual inspection option and 2) the use of building diagnostic testing (blower door method).

The visual inspection option refers to the Air Barrier and Insulation Inspection Criteria of Table 402.4.2. Similar to the *Thermal Bypass Inspection Checklist* which must be completed for homes to earn the ENERGY STAR Qualified New Homes label, Table 402.4.2 requires field inspectors to use their experience and discretion to verify that each component is installed in accordance with the Table 402.4.2 inspection criteria. The tabular criteria includes visual inspection of framing areas where air barriers are commonly missed, or over-stapled, and inspection of insulation to ensure proper alignment with air barriers, thus serving as an extra check that the air-barrier, thermal-barrier and drainage plane are continuous and complete.

The common tool used for measuring air tightness is the blower door, which accurately measures air pressure difference and flow rate. The blower door, as its name implies, is affixed to the front door of the home and using a variable speed fan and manometer, measures how tight a house is. A house air leakage rate (the inverse of air-tightness) can be quantified by inducing a pressure difference across the apparatus and between the interior and exterior of the house, measuring the airflow necessary to maintain this constant pressure difference. A diagnostician or field-inspector then locates air leakage sites requiring additional sealing. For compliance assessment, the blower door measurements, reported 50 Pascal, can be combined with a factor representing the dimensions of the home to yield the comparable air tightness value expressed in  $\text{cfm/ft}^2 @ 50\text{Pa}$  ( $\text{L/min} \cdot \text{m}^2 @ 50\text{Pa}$ ).

Note also, that resulting from final action to Code Change EC13-09/10 (AM PC5,19,20), the 2012 Edition of the IECC makes building diagnostic testing of air leakage (e.g., the blower door method) mandatory. (2009 IECC Section 402.4.2)

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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)

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Q: What do I need to know about duct leakage testing, 2009 IECC Section 403.2.2?

A: Beginning with the 2009 IECC, if any portion of the ducts or air handler are located OUTSIDE the conditioned space (e.g. in a garage, naturally ventilated crawlspace, naturally ventilated attic, etc.), duct tightness must be verified with a duct leakage test. Studies have shown that visual inspection of duct seals in residences is not enough. Estimates reveal that pressure testing ducts in new residential construction will reduce energy consumption in new homes by up to 10% on average and potentially much more in some homes. Accordingly, the code now requires a pressure test. Pressure testing ducts as required by the 2009 IECC is far superior to visual inspection and will definitively confirm that duct leakage is minimized. (2009 IECC Section 403.2.2)

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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)

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Q: We have received feedback from stakeholders that the requirement for R-12 pool covers in accordance with 2009 IECC Sections 403.9.3 and 504.7.3 cannot be met because they are not commercially available. Are swimming pools required to be provided with R-12 insulated covers?

A: No, Only permanently-installed spas (built on-site) and portable electric spas and swim spas (a.k.a., hot tubs), heated to over 90°F (32°C) and primarily used in private homes, hotels, commercial spa- and exercise facilities, must be equipped with the R-12 insulated covers.

There are no 2009 IECC code provisions requiring R-12 insulated covers for in-ground, permanently-installed swimming pools or above-ground swimming pools. Rather the R-12 insulated cover requirement is intended solely for permanently-installed spas (built on-site) and portable electric spas and swim spas (a.k.a., hot tubs), as these covers are designed specifically to reduce both radiation and evaporative losses.

All heated pools lose heat primarily through three mechanisms: radiation, convection and evaporation, but evaporation is by far the largest source of energy loss, particularly for the private swimming pools that many enjoy conveniently in their back yards, and the public swimming pools enjoyed in hotels, schools and water parks around the country.

Note also, that resulting from final action to Code Change EC216-09/10 (AM), the 2012 Edition of the IECC will add in-ground, permanently-installed spas (built on-site) to the energy requirements for pools and aligns with the language found in the *Florida Energy Conservation Code* and Title 24 of the *California Energy Code*. (2009 IECC 403.9.3 and 504.7.3)

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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*<sup>®</sup> (IRC<sup>®</sup>). 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.

## COMMERCIAL, Chapter 5

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Q: For commercial buildings, do 2009 IECC Sections 501.1, Scope, and 501.2, Application, allow the permit applicant to mix-and-match provisions of IECC Chapter 5 and ASHRAE Standard 90.1-2007 on a single permit application for compliance assessment?

A: No, New to the 2009 IECC are revisions to the Scope and Application provisions of the Commercial Chapter 5, Sections 501.1 and 501.2, respectively. The revisions no longer allow designers to select a customized path to compliance using the provisions of both Standard 90.1 and the IECC Chapter 5. In fact, Sections 501.1 and 501.2 now require the designer to demonstrate compliance with either the provisions of IECC Chapter 5 (in its entirety) or the provisions of Standard 90.1 (in its entirety); no combination thereof is permitted.

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Q: Is the installation of an air curtain a suitable alternative to the vestibule requirements of 2009 IECC Section 502.4.6?

A: No. Doors opening into spaces greater than 3,000 square feet, that are intended as building entrance doors and not otherwise dedicated to a dwelling unit, guest room, material handling, mechanical equipment or electrical service function, are required to be provided with a vestibule.

Note however, it is at the discretion of the designer to select the path to energy code compliance most appropriate to the circumstances and the owner's project requirements. Sections 501.1 and 501.2 afford the designer the opportunity to comply with either the provisions of IECC Chapter 5 (in its entirety) or the provisions of Standard 90.1 (in its entirety). More specifically, Section 5.4.3.4 does not require vestibules for buildings in Climate Zones 1 and 2, Buildings in Climate Zones 3 and 4 that are three stories or less in height and <10,000 ft<sup>2</sup> in area, and Buildings in Climate Zones 5-8 <1,000 ft<sup>2</sup> in area.

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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)]

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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](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)

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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 ft<sup>2</sup>, as defined by the *International Building Code*<sup>®</sup>. 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.

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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 ft<sup>2</sup> (929 m<sup>2</sup>) 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)

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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 12<sup>th</sup> grade classrooms);
- Conference/meeting rooms; and
- Employee lunch and break rooms.

(2009 IECC 505.2.1, 90.1-2007 9.4.1.2)

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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/ft<sup>2</sup> 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/ft<sup>2</sup> 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.