

Chicagoland Roofing Council

Building Green Chicago

***ICC's 2012 International Energy
Conservation Code***

Rod Petrick, CRC Past President



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- ***CRC Members are Involved...***
 - IL Licensed Contractors, 'By-Law'
 - Committees
 - Safety – OSHA Alliance
 - Steep & Shingle
 - Industry Affairs @ ICC, City of Chicago, State of IL
 - IL Department of Professional & Financial Regulation
 - Website Listing @ Chicagoroofing.org

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Professional Roofing Contractor's Life

- **“The Life of the Roofing Contractor”**
 - **Technical Issues – Comply with....**
 - Wind, Weight, Ventilation, Underlayment, Insulation, Drainage
 - **Workforce Education & Safety – ‘Culture’**
 - **Insurance Required – WC, GL ... *FOR ROOFING WORK***
 - **Warranty**
 - **Licensing – Limited / Unlimited**
 - **Specification Sections – Division 07**
 - **International Building Code – Chapter 15, 11,**
 - **International Residential Code – Chapter 9**
 - **International Energy Conservation Code 2009 – STATE LAW**
 - **International Green Construction Code - 2012**
 - **International Fire Code**
 - **Installed Cost – Competitive Market**
- **CRC Members - Experience, Safety Culture, Value**

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- **CRC Meetings in Springfield w/CDB, DCOE....**
- CRC Representatives
 - Industry Affairs & President, Vice President, Executive Director, Legislative Consultant
- State of IL
 - Lisa Mattingly – Chair, CDB
 - Bruce Selway – Dept. of Commerce & Economic Opportunity
 - Darren Myers, International Energy Code Consultants, consulting to CDB



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- **2012 IL ACTIONS by CRC ...**
- Feb. - CRC Participated in IL Energy Advisory Council Teleconference
- Feb. - CRC Petition sent to IL Energy Advisory Council..referred to **Joint Committee on Administrative Rules (JCAR)**, CDB as facilitator
- June - CRC Comments to JCAR
- Oct. - CRC Meets with CDB representatives
- Nov. - CRC Supports Clarifications as submitted by CDB
- Jan. 2013 – Final Clarifications

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- Commercial & Residential Buildings - IECC
 - 2012 IECC Insulation Increased
 - 15% improvement over 2009 IECC
 - 30% Improvement over 2006 IECC
 - NEW Air Barrier Requirement
 - Skylights for large spaces, 15' Ceilings
 - ASHRAE 90.1-2010 references
 - Much more...

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- Commercial & Residential Buildings - Insulation
 - IECC Insulation...Commercial, Low Slope, +30%
 - 2006 – R-15
 - 2009 – R-20
 - 2012 – R-25
 - IECC Insulation – Residential, +39%
 - 2006 - R-38, (but R-30 'Deemed to Comply...')?)
 - 2009 - R-38
 - 2012 – R-49

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- Commercial Buildings – General
 - Insulation
 - Increases IECC 2009 from **R-20** to IECC 2012 **R-25**
 - NEW Air Barrier
 - Required in New Construction & Existing Buildings
 - Required in Residential Construction...more later.
 - Reflectivity -
 - Chicago only
 - Suburbs & Downstate – Not Required

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What's an Air Barrier??

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material or a combination of materials.

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C402.4.1.1 Air barrier construction. The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be **continuous** for all assemblies that are the thermal envelope of the building and **across the joints and assemblies**.
2. **Air barrier joints and seams shall be sealed**, including sealing transitions in places and changes in materials. Air barrier penetrations shall be sealed in accordance with Section C402.4.2. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.
3. Recessed lighting fixtures shall comply with Section C404.2.8. Where similar objects are installed which penetrate the air barrier, **provisions shall be made to maintain the integrity of the air barrier**.

Exception: Buildings that comply with Section C402.4.1.2.3 are not required to comply with Items 1 and 3.

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C402.4.1.2 Air barrier compliance options.

A continuous air barrier for the opaque building envelope shall comply with Section C402.4.1.2.1, C402.4.1.2.2, or C402.4.1.2.3.

Materials - Deemed to Comply

Testing of Assembly

Testing of Whole Building

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C402.4.1.2.1 Materials.

Materials with an air permeability no greater than 0.004 cfm/ft² (0.02 L/s · m²) under a pressure differential of 0.3 inches water gauge (w.g.) (75 Pa) when tested in accordance with **ASTM E 2178** shall comply with this section.

Materials in Items 1 through 15 shall be deemed to comply with this section provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions.

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...These shall be **Deemed to Comply:**

1. Plywood – no < 3/8 inch (10 mm)
2. OSB board no < 3/8 inch (10 mm).
3. Extruded polystyrene insulation board – no < 1/2 inch.
4. Foil-back polyisocyanurate insulation board no < 1/2 inch
5. Closed cell spray foam – min. density 1.5 pcf no < 1-1/2”
6. Open cell spray foam w/density between 0.4 and 1.5 pcf.
and having a thickness of not less than 4.5”.
7. Exterior or interior gypsum board no < 1/2 “.
8. Cement board having no < 1/2”.

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...These shall be **Deemed to Comply:**

9. Built up roofing membrane.
10. Modified bituminous roof membrane.
11. Fully adhered single-ply roof membrane.
12. A Portland cement/sand parge, or gypsum plaster no < 5/8 inch (16 mm).
13. Cast-in-place and precast concrete.
14. Fully grouted concrete block masonry.
15. Sheet steel or aluminum.

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C402.4.1.2.2 Assemblies. Assemblies of materials and components comply ...

- **Average air leakage** - **Not to exceed 0.04 cfm/ft²** (0.2 L/s · m²) under a pressure differential of 0.3 inches of water gauge (w.g.)(75 Pa) when tested in accordance with ASTM E 2357, ASTM E 1677 or ASTM E 283 shall comply with this section.
- **Assemblies** listed in Items 1 and 2 shall be deemed to comply provided joints are sealed and requirements of Section C402.4.1.1 are met.
 1. **Concrete masonry walls** coated with one application either of block filler and two applications of a paint or sealer coating;
 2. **A Portland cement/sand parge, stucco or plaster** minimum 1/2 Inch (12 mm) in thickness.

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C402.4.1.2.3 Building test.

The completed building shall be tested to comply...

- Air leakage rate of the *building envelope*
 - ...shall not exceed **0.40 cfm/ft²** ... 0.3 inches water gauge (2.0 L/s · m² at 75 Pa) pressure, ASTM E 779
 - ...or an equivalent method approved by the code official

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- R - Residential Requirements....



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Residential Air Barrier Requirements....

R402.4 Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.4.

R402.4.1 Building thermal envelope. The *building thermal envelope* shall comply with Sections R402.4.1.1 and R402.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

R402.4.1.1 Installation. The components of the *building thermal envelope* as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of construction. **Where required by the code official, an approved third party shall inspect all components and verify compliance.**

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Residential Air Barrier Requirements – Compliance...

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8.

Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals).

Where required by the *code official*, testing shall be conducted by an *approved third party*. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

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During blower testing:

1. **Exterior windows and doors, fireplace and stove doors shall be closed**, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. **Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed**, but not sealed beyond intended infiltration control measures;
3. **Interior doors**, if installed at the time of the test, **shall be open**;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. **Heating and cooling systems**, if installed at the time of the test, shall be **turned off**; and
6. **Supply and return registers**, if installed at the time of the test, shall be fully **open**.

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- Back to Commercial Buildings ...
 - Reflectivity, Thermal Emittance
 - Insulation
 - Air Barrier

IECC 2012 and/or ASHRAE 90.1-2010

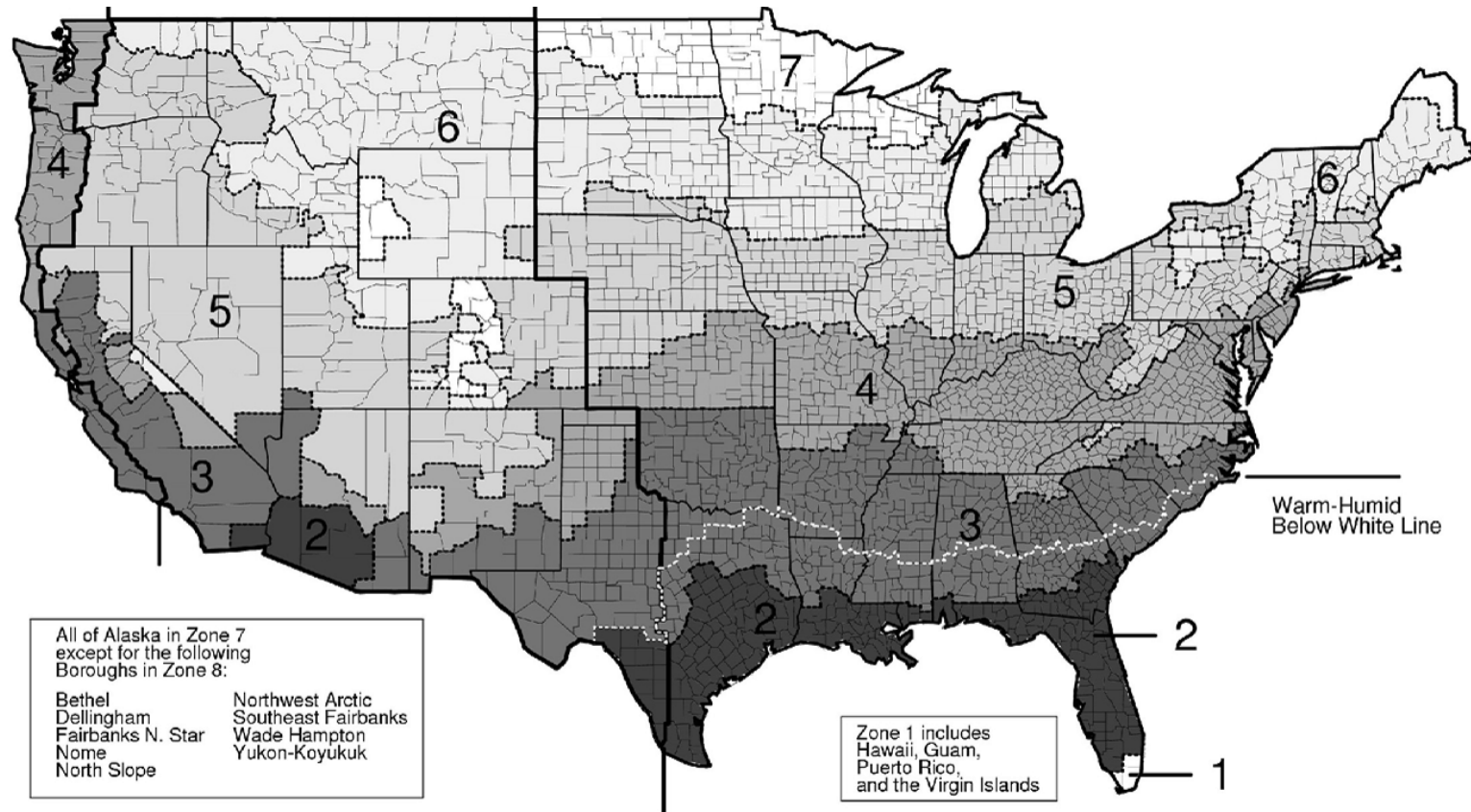
NEW CONSTRUCTION

- Must follow one for the whole building (no “pick-and-choose”)
- Clarification – Mix OK for Existing Buildings
 - Reroofing
 - Roof Repair
 - Roof Replacement

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C402.2.1.1 Roof solar reflectance and thermal emittance.

Low-sloped roofs, with a slope less than 2 units vertical in 12 horizontal, directly above cooled *conditioned spaces* in **Climate Zones 1, 2, and 3** shall comply with one or more of the options in Table C402.2.1.1.



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- ***Reflectivity---Chicago Only...Chicago Code***
- Chicago Urban Heat Island Ordinance
 - Initial Solar Reflectance - .72
 - Three Year Aged Reflectance - .5
 - Cool Roof Rating Council
 - Energy Star
 - Exceptions...
 - Ballasted Roofs - 15lbs.
 - Garden Roofs
 - Photovoltaic Panels

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- **IECC 2012 State of IL Clarifications – Existing Buildings**
 - Reroofing
 - Roof Recover
 - Roof Replacement
 - Roof Repair

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IBC 2012 Ch. 2 Definitions

ROOF ASSEMBLY (For application to Chapter 15 only).

A **system** designed to provide weather protection and resistance to design *loads*. The system consists of a *roof covering* and *roof deck* or a single component serving as both the roof covering and the *roof deck*. A roof assembly includes the **roof deck, vapor retarder, substrate or thermal barrier, insulation, vapor retarder and roof covering.**

ROOF COVERING. The **covering** applied to the *roof deck* for **weather resistance, fire classification or appearance.**

ROOF COVERING SYSTEM. See “Roof assembly.”

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- **IBC Ch. 2 Definitions**

- **REROOFING.** The process of recovering or replacing an existing *roof covering*. See “Roof recover” and “Roof replacement.”
- **ROOF RECOVER.** The process of installing an additional *roof covering* over a prepared existing *roof covering* without removing the existing *roof covering*.
- **ROOF REPAIR.** Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance.
- **ROOF REPLACEMENT.** The process of removing the existing *roof covering*, repairing any damaged substrate and installing a new *roof covering*.

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- Most Questions...IBC / IECC - What if we...
 - Tear off only the roof covering?
 - Tear off a few squares?
 - Peel off & install new roof covering ?
 - Other modification

- Do we need to upgrade insulation?

- Answer? ...NO...

‘Don’t increase energy consumption of the building....’

....as Required by Authority Having Jurisdiction

...Code Official

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ANSWERS...As clear as....

C101.4.3 Additions, alterations, renovations or repairs.

Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction **without requiring the unaltered portion(s) of the existing building or building system to comply with this code.**

Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

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Exception: The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. **Construction where the existing roof, wall or floor cavity is not exposed.**
5. **Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.**

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Exception: The following need not comply provided the energy use of the building is not increased:

6. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed,
7. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

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- **Commercial Buildings –**

- **State of IL, Air Barrier Clarification**

...issues pertaining to *reroofing, roof recover, roof replacement* defined by the IBC, the *Illinois Energy Conservation Code*, and the 2012 IECC, **only items altered or affected by alterations, renovations or repairs** to an existing building are required to conform to the provisions of the code as they relate to new construction....

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- **Commercial Buildings – Air Barrier Clarification**
- Note there are several Exceptions (1-8) itemized in Section C101.4.3 which permit a degree of compliance subject to approval of the code official. With respect to *reroofing* (Exception 5), the 2012 IECC considers work affecting roofing insulation an *alteration* to the building.

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- **Commercial Buildings – Air Barrier Clarification**
- A roofing membrane, however, is considered a *roof covering*, and as such, is subject to only to the construction requirements of the Building Code of the jurisdiction, likely IBC Chapter 15

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- **Commercial Buildings –**
- **Insulation & Air Barrier Clarification**
- ‘Therefore, work considered *reroofing* or *roof recovering* is not subject to the provisions of **Section C402.4.1, provided the existing insulation level is unaltered** (i.e., unmodified).’

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- **Commercial Buildings – Air Barrier Clarification**
- ‘....The provisions of both the 2012 IECC with respect to alterations and repairs affecting the building thermal envelope, and the IBC specific to alterations and repairs affecting building roof coverings are coordinated in this regard.’

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- **Commercial Buildings – Air Barrier Clarification**

- ‘Put simply, no continuous Air Barrier is required when the extent of work is **limited solely to reroofing, roof recover, roof replacement as defined by the IBC**, and the Exceptions (1-8) itemized in Section C101.4.3, which permit a degree of compliance...subject to approval of the code official.’

- State of IL Website...

[http://www.ildceo.net/dceo/Bureaus/Energy Recycling/FAQ-2.htm](http://www.ildceo.net/dceo/Bureaus/Energy_Recycling/FAQ-2.htm)

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- **Commercial Buildings –**
- **IL Existing Buildings Insulation Clarification**
 - ‘The use of ASHRAE Standard 90.1-2010 as an alternative compliance path for commercial buildings is permitted....’

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- **Commercial Buildings –**
- **Existing Buildings Insulation Clarification**
 - ‘Table 5.5-5 of Standard 90.1 allows commercial roofs in Illinois, with insulation entirely above deck, to be insulated to **R-20 in lieu or the 2012 IECC requirement for R-25.**’
 - ‘Therefore, **both paths to compliance (IECC or ASHRAE Standard 90.1) are recognized compliance options.**’

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- **Commercial Buildings - Insulation**

- 'Table 5.5-5 of Standard 90.1 allows commercial roofs in Illinois, with insulation entirely above deck, to be insulated to **R-20 in lieu or the 2012 IECC requirement for R-25.'**

- Does this mean if we only peel the membrane off we have to upgrade from R-15 to R-20??

- Back to the Building Code Official (AHJ) for Approval

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- State of IL Website - Clarifications JAN. 18...
- General -
http://www.ildceo.net/dceo/Bureaus/Energy_Recycling/FAQ-index.htm
- Roofing Related
- http://www.ildceo.net/dceo/Bureaus/Energy_Recycling/FAQ-2.htm

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- ***CRC Members...***
- **One Call, Single Source Responsibility**



CRCA TODAY

WINTER 2012

The Magazine
of Roofing and
Waterproofing
in Chicago
and Beyond

Preventing
Severe Injuries

CRCA Tech News

CRCA 30th
Annual Trade
Show & Seminars



Chicago Roofing
Contractors Association
Trade Show & Seminars Issue



Chicago Roofing Contractors Association

CRCA Trade Show & Seminars

Jan. 23-24, 2014

Drury Lane Conference Center

Oakbrook Terrace, IL

www.CRCA.org

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