



**CRCA POSITION STATEMENT**  
**LOW ROOF FLASHING HEIGHTS & INSULATION THICKNESSES**  
**BILL MCHUGH, CRCA – MARCH 5, 2020**

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**Introduction**

There are questions that have been raised about ‘when is there enough low flashing to invoke the reduction in R-Value on a roof?’ The purpose of this document is to present possible scenarios where a ‘Technical Infeasibility’ exists for CRCA Members and the roofing industry, code officials, building owners and managers, to make decisions.

**IECC in Illinois & Chicago**

The Illinois Adoption of the International Energy Conservation Code (IECC) requires in this climate zone a minimum (min) R-30 continuous insulation (ci) for low sloped roofs where the insulation is installed above the roof deck. This min. R-30 ci is required for new construction and existing buildings. The City of Chicago’s adoption of the IECC has the same min. R-30 ci requirement.

**Illinois Exceptions to min. R-30 ci**

There is an exception for existing buildings in the Illinois Adoption of the IECC that allows a reduced thickness of insulation when flashing heights are not high enough to accommodate the 6” required for min. R-30 ci. This is called a ‘Technical Infeasibility’. In Illinois, approval is needed from the code official of the Technical Infeasibility, BEFORE starting work.

**Technical Infeasibility & Flashing Height Limitation Scenarios**

What happens when adding the code required min. R-30 ci will cause the flashing heights to be reduced below the best practice minimum of 8” above the roof surface.? The insulation just won’t fit in the thickness allows. Further scenarios for general Technical Infeasibility include:

- 1. How many rooftop units before it is technically infeasible to install 6” thick insulation?**
  - a. HVAC, of what size? How many?
  - b. Gas Lines? Lineal footage?
  - c. Skylights, where minimum flashing height is 4”? how many, what size?
  - d. Roof hatches?
  
- 2. How long a length of windows?**
  
- 3. How many penthouses, doors?**
  
- 4. What amount of perimeter parapet?**
  
- 5. What amount of perimeter wood blocking?**
  
- 6. What is the minimum flashing height?**  
(CRCA NOTE: NRCA, Manufacturers Installation Instructions, Manufacturers Details, CRCA Documents state 8” above roof membrane surface.)



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### **When is it Technically Infeasible in Illinois and Why?**

The intent of the IECC for existing buildings is to not increase the energy use of the building, and, if possible, make the building more energy efficient. The rooftop is Technically Infeasible when the flashing heights for various items cannot meet the required minimum 8" flashing heights. It also is when adding the required insulation requires rebuilding the rooftop to accommodate the added thicknesses. Section 503.1 of the Commercial IECC states:

*Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. [Excerpt from 2018 IECC, 503.1]*

The National Roofing Contractors Association Manuals, Manufacturers Installation Instructions referenced in the Building Code, state that flashing heights are to be a minimum of 8" above the roof surface. This protects against wind driven rain, snow and other water entering the building through the flashings. The Chicago Roofing Contractors Association's specification documents from 1968 also show 8" minimum flashing heights. The exception to the 8" height is skylights, which have a 4" flashing height since they are pre-fabricated units, and sealed.

This section of the code speaks to the scope of work when *reroofing* an existing building. Roofing at existing buildings is performed to fix the roof and keep the building watertight. If the required insulation cannot be added due to lack of room to install the added insulation thicknesses, then a variance should be sought to install the maximum amount of insulation while still meeting the 8" flashing heights recommended by NRCA and others. If no flashing height constraints exist, then there is no Technical Infeasibility and insulation shall be installed to the thickness required for the min. R-30 ci for compliance to new construction.

### **When is it Technically Infeasible in Chicago?**

In the new Chicago Existing Building Code, Chapter 3 (below) states the same Technical Infeasibility Clause. The difference between Chicago and Illinois' code for Technical Infeasibility is that Chicago does not require code official approval prior to roofing operations. Chicago only requires a statement during permit application of the technical infeasibility.

### **Technical Infeasibility Answers, Precautions.**

In the State of Illinois, the Code Official needs to approve any variance from the min. R-30 ci insulation thicknesses used on a structure. The variance from the energy code required insulation thicknesses needs to be approved before starting work, and preferably before *reroofing* project specifications or proposals are drafted. That means the roofing contractor and building owner and manager should meet with the code official long before providing a proposal for *reroofing* in order to understand the operations required.

### **What about Manufacturers granting variances to 8" Flashing Heights?**

Any manufacturer can offer a variance to what is in their published literature. However, the manufacturers installation instructions are referenced in the International Building Code, Chicago Building Code – which are adopted by law.

Should a variance be granted, CRCA Recommends the roofing contractor get written documentation on the roofing manufacturers letterhead granting the variance. Once the manufacturer variance is documented, the roofing contractor needs to keep the documentation with the project records. Verify if the code official might need to approve the variance from the manufacturer's installation instructions.



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### **IBC 2018 Reroofing Code Sections**

**ROOF REPAIR.** Reconstruction or renewal of any part of an existing roof for the purposes of its maintenance. [IBC 2018 202]

**ROOF RECOVER.** The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering. [IBC 2018 202]

**ROOF REPLACEMENT.** The process of removing the existing roof covering, repairing any damaged substrate and installing a new roof covering.  
[IBC 2018 202]

**These terms are the only terms used in the International Building Code to describe roofing work at existing buildings. These are the only terms that should be used on construction documents, permits, and proposals to describe the operations.**

### **ILLINOIS CHAPTER 5 [CE] EXISTING BUILDINGS SECTION C503 - ALTERATIONS**

**C503.1 General.** Alterations to any building or structure shall comply with the requirements of Section C503 and the code for new construction. Alterations shall be such that the existing building or structure is not less conforming to the provisions of this code than the existing building or structure was prior to the alteration. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall not create an unsafe or hazardous condition or overload existing building systems. Alterations complying with ANSI/ASHRAE/IESNA 90.1. need not comply with Sections C402, C403, C404 and C405.

**Exceptions:** The following alterations need not comply with the requirements for new construction, provided the energy use of the building is not increased:

8. Roof replacements for roof systems 2:12 slope or less shall comply with the low slope roof insulation requirements unless the installation of insulation above the structural roof deck, and necessary to achieve the code-required R-Value, is deemed infeasible by the code official to accommodate the added thickness of insulation above the roof deck. Conditions of infeasibility due to flashing heights presented by existing rooftop conditions include, but are not limited to, HVAC or skylight curb, low door or glazing, parapet, weep holes, drainage patterns, cricket or saddle construction. These conditions are subject to manufacturer's specifications, manufacturers installation instructions and code official approval.

### **CRCA NOTE TO COMMERCIAL ENERGY CODE EXCEPTION 8:**

In this section of the Illinois adoption of the International Energy Conservation Code, the exception #8 discusses Technical Infeasibility. It allows for the insulation thickness to be less than the code required min. R-30 ci. The section also incorporates the manufacturers installation instructions and code official approval. The manufacturers installation instructions are for installation of the roof covering, while the code official approval covers the reduction in insulation thicknesses.

In cases where this exception is used, it is recommended to document to the building owner and manager key energy points. It is important to state that the installation, while approved by the code official, does not comply with the energy code as it relates to new construction requirements.



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**ILLINOIS Residential Sections: SECTION R503 - ALTERATIONS**

**R503.1.1 Building envelope.** Building envelope assemblies that are part of the alteration shall comply with Section R402.1.3 or R402.1.4, Sections R402.2.1 through R402.2.13, R402.3.1, R402.3.2, R402.4.3 and R402.4.5.

**Exceptions:** The following alterations shall not be required to comply with the requirements for new construction provided the energy use of the building is not increased:

*Illinois Residential Section*

8. For roof replacement on existing buildings with a roof slope of less than 2 units vertical in 12 units horizontal (2:12), and where the roof covering is removed and insulation remains, and where the required R-value cannot be provided due to thickness limitations presented by existing rooftop conditions, (including heating, ventilating and air-conditioning equipment, low door or glazing heights, parapet heights, weep holes, and roof flashing heights not meeting the manufacturer's specifications), the maximum thickness of insulation compatible with the available space and existing uses shall be installed. Insulation used shall be minimum R-3.5 per inch. In areas where flashing may be terminated a minimum of 8 inches above the roof covering (including required insulation) insulation shall be a minimum of R-20.

**CRCA NOTE TO RESIDENTIAL ENERGY CODE EXCEPTION 8:**

In the RESIDENTIAL section of the Illinois adoption of the International Energy Conservation Code, the exception #8 discusses Technical Infeasibility and also states that the min R value of the insulation shall be R-3.5 per inch. Where there is allowable flashing height, a min. R-20 ci shall be installed.

In cases where this exception is used, it is recommended to document to the building owner and manager key energy points. It is important to state that the installation, while approved by the code official, does not comply with the energy code as it relates to new construction requirements.

2018 Chicago Existing Building Code, based on 2018 Intl. Existing Building Code

**SECTION 306 REROOFING**

**306.1 General.** Materials and methods of application used for roof recover and roof replacement shall comply with the requirements of Chapter 15 of the Chicago Building Code. Roof repair not exceeding 25 percent of the surface area of an existing roof may comply with Chapter 4 of this code.

**Exceptions:**

1. Roof replacement or roof recover of existing low sloped roofs shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 of the Chicago Building Code for roofs that provide positive roof drainage.
2. Roof replacement or roof recover of existing low sloped roofs shall comply with the roof insulation requirements for new construction unless the installation of additional insulation above the structural roof deck is infeasible due to the height of existing parapets, equipment curbs, skylight curbs, window sills, door thresholds, and similar elements with flashing into the roof system. In no case shall a roof replacement or roof recover reduce the insulating value of the roof.
3. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1502 of the Chicago Building Code for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1502 of the Chicago Building Code.



**306.2 Structural requirements.** Reroofing shall comply with the requirements of Section 706.

**Exception:** For roof repair not exceeding 25 percent of the surface area of an existing roof, structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

**306.3 Roof replacement.** Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.

**Exception:** Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be allowed to remain in place and be covered with an additional layer of ice barrier membrane in accordance with Section 1507 of the Chicago Building Code.

**306.3.1 Roof recover.** The installation of a new roof covering over an existing roof covering shall be allowed where any of the following conditions occur:

1. The new roof covering is installed in accordance with the roof covering manufacturer's instructions.
2. Complete and separate roofing systems, such as standing-seam metal roof panel systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, are installed.
3. Metal panel, metal shingle and concrete and clay tile roof coverings are installed over existing wood shake roofs in accordance with Section 306.4.
4. A new protective roof coating is applied over an existing protective roof coating, a metal roof panel, metal roof shingles, mineral-surfaced roll roofing, a built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing or a spray polyurethane foam roofing system.

**Exception:** A roof recover shall not be allowed where any of the following conditions occur:

1. The existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. The existing roof covering is slate, clay, cement or asbestos-cement tile.
3. The existing roof has two or more applications of any type of roof covering unless approved based on a condition report complying with Section 104 of the Chicago Minimum Requirements for Existing Buildings that establishes the capacity of the roof structure to support additional weight.

**306.4 Roof recovering.** Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place.

**306.5 Reinstallation of materials.** Existing slate, clay or cement tile shall be allowed for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counter flashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

**306.6 Flashings.** Flashings shall be reconstructed in accordance with manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation.



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## **2018 International Building Code - SECTION 1511 – REROOFING**

**1511.1 General.** Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15.

**Exceptions:**

1. Roof replacement or roof recover of existing low slope roof coverings shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section 1507 for roofs that provide positive roof drainage.
2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in Section 1503.4 for roofs that provide for positive roof drainage. For the purposes of this exception, existing secondary drainage or scupper systems required in accordance with this code shall not be removed unless they are replaced by secondary drains or scuppers designed and installed in accordance with Section 1503.4.

**1511.2 Structural and construction loads.** Structural roof components shall be capable of supporting the roof-covering system and the material and equipment loads that will be encountered during installation of the system.

**1511.3 Roof replacement.** Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.

**Exception:** Where the existing roof assembly includes an ice barrier membrane that is adhered to the roof deck, the existing ice barrier membrane shall be permitted to remain in place and covered with an additional layer of ice barrier membrane in accordance with Section 1507.

**1511.3.1 Roof recover.** The installation of a new roof covering over an existing roof covering shall be permitted where any of the following conditions occur:

1. Where the new roof covering is installed in accordance with the roof covering manufacturer's approved instructions.
2. Complete and separate roofing systems, such as standing-seam metal roof panel systems, that are designed to transmit the roof loads directly to the building's structural system and that do not rely on existing roofs and roof coverings for support, shall not require the removal of existing roof coverings.
3. Metal panel, metal shingle and concrete and clay tile roof coverings shall be permitted to be installed over existing wood shake roofs when applied in accordance with Section 1511.4.
4. The application of a new protective roof coating over an existing protective roof coating, metal roof panel, built-up roof, spray polyurethane foam roofing system, metal roof shingles, mineral-surfaced roll roofing, modified bitumen roofing or thermoset and thermoplastic single-ply roofing shall be permitted without tear off of existing roof coverings.

**1511.3.1.1 Exceptions.** A roof recover shall not be permitted where any of the following conditions occur:

1. Where the existing roof or roof covering is water soaked or has deteriorated to the point that the existing roof or roof covering is not adequate as a base for additional roofing.
2. Where the existing roof covering is slate, clay, cement or asbestos-cement tile.
3. Where the existing roof has two or more applications of any type of roof covering.

**1511.4 Roof recovering.** Where the application of a new roof covering over wood shingle or shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place.



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**1511.5 Reinstallation of materials.** Existing slate, clay or cement tile shall be permitted for reinstallation, except that damaged, cracked or broken slate or tile shall not be reinstalled. Existing vent flashing, metal edgings, drain outlets, collars and metal counter flashings shall not be reinstalled where rusted, damaged or deteriorated. Aggregate surfacing materials shall not be reinstalled.

**1511.6 Flashings.** Flashings shall be reconstructed in accordance with approved manufacturer's installation instructions. Metal flashing to which bituminous materials are to be adhered shall be primed prior to installation. **[IBC 2018, Reroofing, Section 1511]**

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