

Proposal Summary

Multifamily Restructuring – Snapshot QII

Updated: February 3, 2023

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Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on February 14, 2023. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by February 28.

Measure Description

QII is currently a prescriptive requirement for multifamily buildings with three or fewer habitable stories. This measure would maintain the prescriptive quality insulation installation (QII) requirements and verification protocol for multifamily buildings of three or fewer habitable stories.

The measure would add a snapshot QII requirement for multifamily buildings with four or more habitable stories. Snapshot QII includes QII inspection of all open envelope cavities at a single point in time, rather than requiring inspection of 100 percent of the envelope, for multifamily buildings with staged construction.

The proposed change would apply to additions greater than 700 square feet of conditioned floor area based on the building's number of habitable stories. The proposed change does not apply to alterations or to buildings using curtainwall assembly types. An exception for Climate Zone 7, which currently exists for buildings up to three habitable stories, would apply to all multifamily buildings (both full and snapshot QII).

Data Needs/Stakeholder Information Requests

The Statewide CASE Team has the following questions for stakeholders:

- What technical challenges prevent buildings from pursuing or complying with the existing QII requirement in multifamily buildings, if any?
- Would requiring insulation installers to undergo training for QII increase insulation installation quality?
- How could we time visits so that the building is in the right phase of construction to verify air sealing and insulation quality?

Data may be provided anonymously. To participate or provide information, please email Lucy Albin, LAlbin@trccompanies.com directly and cc info@title24stakeholders.com.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2022 documents are marked with red underlining (new language) and ~~strikethroughs~~ (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in **yellow**.

Please note that the markups below are preliminary, and subject to changes in structure.

Standards

Section 170.2(a)6

All buildings ~~up to three habitable stories~~ shall comply with the Quality Insulation Installation (QII) requirements shown in TABLE 170.2-A. When QII is required, insulation installation shall meet the criteria specified in Reference Appendix RA3.5. Multifamily buildings with three or fewer habitable stories shall comply with full QII requirements, and multifamily buildings with four or more habitable stories shall comply with Snapshot QII requirements.

EXCEPTION to Section 170.2(a): The insulation requirements of TABLE 170.2-A and TABLE 170.2-B may be met by ceiling, roof deck, wall, or floor assemblies that meet the required maximum U-factors using a U-factor calculation method that considers the thermal effects of all elements of the assembly and is approved by the Executive Director.

TABLE 170.2-A ENVELOPE COMPONENT PACKAGE – Multifamily Standard Building Design

| Multifamily | | | Climate Zone | | | | | | | | | | | | | | | | |
|-------------|--|---|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| R | Option B (meets § 170.2(a)(1)(B)(i)) | Below Roof Deck Insulation ^{1,2} (With Air Space) | NR | NR | NR | R19 | NR | NR | NR | R19 | R19 | R13 | R19 | R19 | R19 | R19 | R19 | R13 | |
| | | Ceiling Insulation | R 38 | R 38 | R 30 | R 38 | R 30 | R 30 | R 30 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 |
| | | Radiant Barrier | NR | REQ | REQ | NR | REQ | REQ | REQ | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| | | Low-sloped | Aged Solar Reflectance | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.63 | NR | 0.63 | NR |
| | | | Thermal Emittance | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.75 | NR | 0.75 | NR |
| | | | Solar Reflectance Index (SRI) | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 75 | NR | 75 | NR |
| | | Steep-sloped | Aged Solar Reflectance | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | NR |
| | | | Thermal Emittance | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | NR |
| | | | Solar Reflectance Index (SRI) | NR | NR | NR | NR | NR | NR | NR | NR | NR | 16 | 16 | 16 | 16 | 16 | 16 | NR |
| | Option C (meets § 170.2(a)(1)(B)(ii)) | Ceiling Insulation | R 38 | R 30 | R 30 | R 30 | R 30 | R 30 | R 30 | R 30 | R 30 | R 30 | R 38 | R 38 | R 38 | R 38 | R 38 | R 38 | |
| | | Radiant Barrier | NR | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | REQ | NR | |
| | | Low-sloped | Aged Solar Reflectance | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.63 | NR | 0.63 | NR |
| | | | Thermal Emittance | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.75 | NR | 0.75 | NR |
| | | | Solar Reflectance Index (SRI) | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | 75 | NR | 75 | NR |
| | | Steep-sloped | Aged Solar Reflectance | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | NR |
| | | | Thermal Emittance | NR | NR | NR | NR | NR | NR | NR | NR | NR | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | NR |
| | | | Solar Reflectance Index (SRI) | NR | NR | NR | NR | NR | NR | NR | NR | NR | 16 | 16 | 16 | 16 | 16 | 16 | NR |
| | | Option O (meets § 170.2(a)(1)(B)(iii)) | Metal Building U-factor | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 | 0.041 |
| | Wood Framed and Other U-factor | | 0.028 | 0.028 | 0.034 | 0.028 | 0.034 | 0.034 | 0.039 | 0.028 | 0.028 | 0.028 | 0.028 | 0.028 | 0.028 | 0.028 | 0.028 | 0.028 | |
| Low-sloped | Aged Solar Reflectance | | NR | NR | NR | NR | NR | NR | NR | NR | 0.63 | 0.63 | 0.63 | NR | 0.63 | 0.63 | 0.63 | NR | |
| | Thermal Emittance | | NR | NR | NR | NR | NR | NR | NR | NR | 0.75 | 0.75 | 0.75 | NR | 0.75 | 0.75 | 0.75 | NR | |
| | Solar Reflectance Index (SRI) | | NR | NR | NR | NR | NR | NR | NR | NR | 75 | 75 | 75 | NR | 75 | 75 | 75 | NR | |

| | Steep-sloped | Aged Solar Reflectance | NR | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | NR | | |
|----------------|--|-------------------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | Thermal Emittance | NR | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | NR | |
| | | Solar Reflectance Index (SRI) | NR | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | NR | |
| Walls | Metal-Building, any fire rating | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.061 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | |
| | Framed, (wood, metal, and others) >1hr fire rating | 0.059 | 0.059 | 0.059 | 0.059 | 0.059 | 0.065 | 0.065 | 0.059 | 0.059 | 0.059 | 0.059 | 0.051 | 0.059 | 0.059 | 0.051 | 0.051 | 0.051 | |
| | Framed (wood, metal and others), ≤1hr fire rating ³ | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.065 | 0.065 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | 0.051 | |
| | Mass Light ^{4,5} | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.077 R 13 | U 0.059 R 17 |
| | Mass Heavy | 0.253 | 0.650 | 0.650 | 0.650 | 0.650 | 0.690 | 0.690 | 0.690 | 0.690 | 0.690 | 0.650 | 0.184 | 0.253 | 0.211 | 0.184 | 0.184 | 0.184 | 0.160 |
| Floors/Soffits | Slab Perimeter, Three Habitable Stories or less | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR | U 0.58 R 7.0 |
| | Wood Framed | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 | U 0.037 R 19 |
| | Raised Mass | U 0.092 R 8.0 | U 0.092 R 8.0 | U 0.269 R 0 | U 0.269 R 0 | U- 0.269 R 0 | U 0.269 R 0 | U 0.269 R 0 | U 0.269 R 0 | U 0.269 R 0 | U 0.269 R 0 | U 0.269 R 0 | U 0.092 R 8.0 | U 0.138 R 4.0 | U 0.092 R 8.0 | U 0.092 R 8.0 | U 0.138 R 4.0 | U 0.092 R 8.0 | U 0.092 R 8.0 |

| | | Other | 0.048 | 0.039 | 0.071 | 0.071 | 0.071 | 0.071 | 0.071 | 0.071 | 0.071 | 0.071 | 0.039 | 0.071 | 0.071 | 0.039 | 0.039 | 0.039 | | |
|--|---|---|---------------|--------------|---------------|--------------|---------------|-------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|------|------|
| Quality Insulation Installation (QII) for buildings up to three habitable stories | <u>Three or fewer habitable stories</u> | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | NR | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | Yes Full | | |
| | <u>Four or more habitable stories</u> | Snaps hot | Snaps shot | Snaps hot | Snaps shot | Snaps hot | Snaps shot | NR | Snaps shot | Snaps hot | Snaps shot | Snaps hot | Snaps shot | Snaps hot | Snaps shot | Snaps hot | Snaps shot | Snaps hot | | |
| Fenestration | Curtain Wall/ Storefront | Maximum U-factor | 0.38 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.41 | 0.38 | |
| | | Maximum RSHGC, three or fewer habitable stories | NR | 0.26 | NR | 0.26 | NR | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.25 | 0.26 | NR | |
| | | Maximum RSHGC, four or more habitable stories | 0.35 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.26 | 0.25 | 0.26 | 0.25 | |
| | | Minimum VT, four or more habitable stories | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | |
| | NAFS 2017 Performance Class AW ⁵ | Maximum U-factor | 0.38 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.38 |
| | | Maximum RSHGC, three or less habitable stories | NR | 0.24 | NR | 0.24 | NR | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | NR |
| | | Maximum RSHGC, four or more habitable stories | 0.35 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | 0.24 | |
| | | Minimum VT, four or more habitable stories | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | |
| | All Other Fenestration | Maximum U-factor | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.34 | 0.34 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | |
| | | Maximum RSHGC, three or less habitable stories | NR | 0.23 | NR | 0.23 | NR | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | NR | |
| | | Maximum RSHGC, four or more habitable stories | 0.35 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | |
| | Maximum Window to Floor Ratio | | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | |
| | Maximum Window to Wall Ratio | | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | 40% | |
| Maximum Skylight Roof Ratio | | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | | |

| | | | | | | | | | | | | | | | | | | | |
|-----------------------------|------------------|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Exterior Doors ⁶ | Maximum U-factor | Dwelling Unit Entry | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | |
| | | Common Use Area Entry Non-Swinging | 0.50 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 0.50 |
| | | Common Use Area Entry Swinging | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 | 0.70 |

Reference Appendices

RA3 RESIDENTIAL FIELD VERIFICATION AND DIAGNOSTIC TEST PROTOCOLS Section

3.5 Quality Insulation Installation Procedures RA3.5.1 Purpose and Scope

RA3.5 is a procedure for verifying the quality of insulation installation and air leakage control used in **low-rise** residential buildings. This procedure is to be followed by the insulation installer and a qualified Home Energy Rating System (HERS) rater must verify its conformance for meeting the requirements of Sections 150.1(c), and 110.7 of the Standards.

The procedure applies to wood and metal construction of framed and non-framed envelope assemblies. Framed assemblies include wall stud cavities, roof/ceiling assemblies, and floors typically insulated with: (1) batts of mineral fiber and mineral wool; (2) loose-fill materials of mineral fiber, mineral wool, and cellulose; (3) spray polyurethane foam; and, (4) rigid board sheathing materials. Non-framed assemblies include wall, roof/ceiling, and floors constructed of structural insulated panels and insulated concrete forms.

Note 1: For newly constructed buildings, this procedure applies to the entire thermal envelope of the building. In many instances, residential homes would use several types of insulation material, even in the same framed assembly. Each insulation material and the integrity of air leakage control for the building's entire thermal envelope must be verified by the HERS rater for the home to comply with the Standards.

Note 2: Structural bracing, tie-downs, and framing of steel or specialized framing used to meet structural requirements of the California Building Code (CBC) are allowed. These areas shall be called out on the building plans with diagrams and/or specific design drawings indicating the R-value amount and fastening method to be used. All structural framing areas shall be insulated in a manner that resists thermal bridging from the outside to the inside of the assembly separating conditioned from unconditioned space. The insulation and air barrier integrity shall be verified by the HERS rater.

Note 3: For newly constructed multifamily buildings, dwelling unit-based sampling methods are not allowed for QII compliance. Multifamily building with three or fewer habitable stories must follow the same full QII protocols and methods as single-family buildings with direct verification of each insulating layer of the entire thermal envelope. Multifamily buildings with four or more habitable stories may follow the Snapshot QII or the full QII verification procedure.

Note 4: Insulated header verification is not required for QII in multifamily buildings.

RA3.5.x Snapshot QII Procedures for Select Multifamily Buildings

Multifamily buildings with four or more habitable stories shall use the Snapshot QII verification procedure to fulfill prescriptive requirements. Multifamily buildings with three or fewer habitable stories may elect to use Snapshot QII verification for reduced compliance using the performance approach. Snapshot QII requires verification of all insulating materials of the thermal envelope that can be verified at the snapshot in time of the verification date(s). Buildings using panelized curtain wall construction methods, rather than cavity framed methods are, exempted from prescriptive snapshot-QII requirements.

During each verification visit, the HERS Rater shall verify all thermal envelope air sealing and insulating materials visually available. The HERS Rater must directly observe at minimum 20 percent of the building's total gross wall area to verify framing cavity air sealing quality, and 20 percent of the building's total gross wall area to verify insulation installation quality. If each of these 20 percent minimums cannot be met in a single visit, the verifier shall return at subsequent dates until the minimum requirements are achieved. The HERS Rater must inspect the first habitable story of each building. This allows any observed failures with the first story to be corrected and prevented for subsequent stories of the building.

Requirements detailed in RA3.5.1 through 3.5.8 apply with the following variations:

- Verification of external insulation, regardless of the building heights, may be done by observation from the ground level at a distance.

If field verification of air sealing and insulation in any of the sampled portions results in a failure, the HERS Rater shall enter the failure into the HERS data registry. Installers shall take corrective action, and the HERS Rater shall re-check the corrective action. If a failure is observed on the first habitable story of the building, the failure must be corrected. The building must still meet the total wall area verification requirement, but the verification performed on the first story will not be counted toward the 20 percent minimum. If a failure is observed on a subsequent floor, the failure must be corrected, and the HERS Rater shall verify 100 percent of the building's remaining wall area that is still visually accessible. The building passes inspection if the HERS Rater verifies that the corrective action was successful during re-check, and if all visually accessible remaining wall area meets the verification requirements.