

| CITY & COUNTY OF DENVER COMMUNITY PLANNING & DEVELOPMENT BUILDING PERMIT POLICY | | |
|---|------------------------------------|-----------------------------|
| Subject: RESCHECK INTERIM SUBMITTAL REQUIREMENTS Prescriptive Compliance Path – –2022 Denver Energy Code | | |
| Approved: Eric Browning, P.E., Building Official | | Drafted by: Vranizan |
| Number: DEC R401.2 | Effective Date: May 1, 2023 | Page: 1 of 3 |

Reference: 2022 Denver Energy Code (DEC)
2021 International Energy Conservation Code (IECC)

Scope: This policy clarifies the Residential project submittal requirements for the Prescriptive Compliance Path allowed by the 2022 Denver Energy Code (DEC) when utilizing the U.S. Department of Energy REScheck tool to demonstrate compliance until a time when this tool is updated to incorporate the provisions of the 2022 Denver Energy Code.

Definitions:

Residential Buildings: Detached one- and two-family dwellings, multiple single-family dwellings (townhouses), and Group R-3 and R-4 buildings three stories or less in height above grade plane.

Policy:

Until REScheck is updated with the 2022 DEC, the following requirements for Residential plans submittals are provided.

Residential Prescriptive Path Requirements

Residential buildings may demonstrate compliance with the Prescriptive Path requirements by using the 2022 DEC. In addition to the requirements of the 2022 DEC, project designs where the national 2021 IECC REScheck is used to demonstrate compliance shall meet the following requirements for the Prescriptive Path, described below:

Envelope Compliance

The 2022 Denver Energy Code includes revisions to some *U*-factors in Table R402.1.2 Maximum Assembly *U*-factors and Fenestration Requirements. See Table 1 below for a summary of the revised *U*-factors. Until REScheck is updated to incorporate the provisions of the 2022 DEC, compliance reports generated by the 2021 REScheck program will use the 2021 IECC *U*-factors. To demonstrate compliance with the 2022 DEC, additional calculations using the amended *U*-factors shall be provided with the REScheck compliance report for review (see suggested instructions below).

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Table 1. 2022 Denver Energy Code Amendments to Table R402.1.2 Maximum Assembly *U*-factors and Fenestration Requirements

| Assembly | 2021 IECC | 2022 DEC |
|---|------------------|-----------------|
| Fenestration <i>U</i> -factor (Glazing area < 15% of conditioned floor area) | 0.32* | 0.27 |
| Fenestration <i>U</i> -factor (Glazing area >= 15% of conditioned floor area) | 0.32* | 0.25 |
| Skylight <i>U</i> -factor | 0.55 | 0.45 |
| Floor <i>U</i> -factor | 0.033 | 0.026 |

* Revised for Climate Zone 5 over 4,000 ft elevation, per footnote *f* in 2021 IECC

Additional Efficiency Package Options

The 2022 Denver Energy Code include significant changes to Section R408 Additional Efficiency Package Options, providing greater flexibility for compliance. Residential plans submittals following the Prescriptive Compliance Path must demonstrate compliance with Section R408 using the table included in the [2022 Denver Energy Code Residential Prescriptive Checklist](#).

In 2021 IECC REScheck, the user must select one Additional Efficiency Package Option to confirm compliance with 2021 IECC. The package selected in REScheck does not impact the UA calculations and DOES NOT count toward compliance with 2022 DEC Section R408. To create consistency between submittals, all users shall select “Efficient HVAC Performance”, regardless of additional efficiency packages selected for compliance with Section R408.

Suggested Calculation Instructions

See Example Calculation (at end of document) for an example of the worked through calculations.

1. Follow the guidelines within REScheck using 2021 IECC to create a compliance certificate report.
 - a. Energy Code: Select 2021 IECC (does not include 2022 DEC)
 - b. Efficiency Package: Select “Efficient HVAC Performance”
2. Using the 2021 IECC REScheck compliance report, calculate the 2022 DEC Maximum UA using the amended *U*-factors.
 - a. Calculate the glazing area (total glazed vertical fenestration) as a percentage of conditioned floor space to determine the maximum fenestration *U*-factor.
 - b. For each assembly with a *U*-factor amended in the 2022 DEC (fenestration, skylights, and floors), multiply the “Gross Area” by the amended *U*-factor to calculate the 2022 DEC “Req. UA” value.
 - c. When all 2022 DEC “Req. UA” values have been calculated, add up all values in the “Req. UA” column to find the 2022 DEC “Maximum UA”
 - d. Compare the calculated 2022 DEC “Maximum UA” to “Your UA” (the UA for your design) provided in the REScheck report

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- i. For compliance with R402.1.5: "Your UA" < DEC "Maximum UA"
- ii. If reduced envelope UA per R408.3 is selected as an additional efficiency package for compliance with R408:
 1. For compliance with R408.3.1: "Your UA" < 0.95*DEC "Maximum UA"
 2. For compliance with R408.3.2: "Your UA" < 0.925*DEC "Maximum UA"
 3. For compliance with R408.3.3: "Your UA" < 0.9*DEC "Maximum UA"
3. NOTE: This may be an iterative process.

END OF POLICY DOCUMENT (EXAMPLE FOLLOWS)

SAMPLE CALCULATION

PURPOSE: provide an example of calculations to show compliance with the 2022 Denver Energy Code before Denver amendments are available in REScheck



Generated by REScheck-Web Software Compliance Certificate

Step 1a. Select 2021 IECC
(does not include 2022 Denver Building Code Amendments)

Project: Example Project (2022 DEC)

Energy Code: **2021 IECC**

Location: **Denver, Colorado**

Construction Type: **Single-family**

Project Type: **New Construction**

Orientation: **Bldg. faces 180 deg. from North**

Conditioned Floor Area: **3,000 ft²**

Glazing Area: **2%**

Climate Zone: **5 (6020 HDD)**

Permit Date:

Permit Number:

Step 2a. Glazing Area Calculation:
Assumption: 50% of door is glazed

Total area of glazed vertical fenestration =
16*5 (windows) + 0.5*32 (50% of door area) = 96 sf

Conditioned floor area = 3,000 sf

% glazing = 96/3,000 = **3.2% < 15%**

Per Table R402.1.2 footnote f, maximum fenestration U-factor for this project = 0.27

Construction Site: 123 Main St. Denver, CO 80208

Owner/Agent:

Designer/Contractor:

Step 2d. Your UA < DEC Maximum UA
This design complies with Section 402.1.5 of 2021 IECC with 2022 Denver Amendments

Compliance: Passes using UA trade-off

Compliance: **0.9% Better than Code** DEC Maximum UA: **450**

~~Compliance: 6.7% Better Than Code~~ ~~Maximum UA: 478~~ Your UA: **446**

The % Better or Worse Than Code Index reflects how close to compliance the house is based on code trade-off rules. It DOES NOT provide an estimate of energy use or cost relative to a minimum-code home.

Slab-on-grade tradeoffs are no longer considered in the UA or performance compliance path in REScheck. Each slab-on-grade assembly in the specified climate zone must meet the minimum energy code insulation R-value and depth requirements.

Step 2b. Multiply Gross Area by amended U-factor to calculate adjusted Req. UA

Amended U-factor per 2022 DEC Table R402.1.2 (typ.)

Step 2c. Adjusted Req. UA, used to determine DEC Maximum UA

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | Prop. U-Factor | Req. U-Factor | Prop. UA | Req. UA |
|---|-------------------------|----------------|---------------|----------------|---------------|----------|-------------------|
| my Ceiling: Flat Ceiling or Scissor Truss | 3,000 | 50.0 | 0.0 | 0.026 | 0.024 | 77 | 72 |
| my Skylight : Metal Frame | 20 | | | 0.500 | 0.550 | 10 | 11 9 |
| Wall 1: Wood Frame, 24" o.c. Orientation: Front | 1,200 | 25.0 | 5.0 | 0.039 | 0.045 | 46 | 53 |
| Door 2: Solid Door (under 50% glazing) Orientation: Front | 32 | | | 0.700 | 0.320 | 22 | 10 8.6 |
| Wall 2: Wood Frame, 24" o.c. Orientation: Front | 1,200 | 25.0 | 5.0 | 0.039 | 0.045 | 45 | 52 |
| Window 1 : Metal Frame Orientation: Front | 16 | | | 0.250 | 0.320 | 4 | 5 4.3 |
| Window 2 : Metal Frame Orientation: Front | 16 | | | 0.250 | 0.320 | 4 | 5 4.3 |
| Window 3 : Metal Frame Orientation: Front | 16 | | | 0.250 | 0.320 | 4 | 5 4.3 |
| Wall 3: Wood Frame, 24" o.c. Orientation: Front | 1,200 | 25.0 | 5.0 | 0.039 | 0.045 | 46 | 53 |
| Window 3 : Metal Frame Orientation: Front | 16 | | | 0.250 | 0.320 | 4 | 5 4.3 |
| Wall 4: Wood Frame, 24" o.c. Orientation: Front | 1,200 | 25.0 | 5.0 | 0.039 | 0.045 | 46 | 53 |

Highlights show assemblies with amended U-factors in 2022 DEC Table R402.1.2 (fenestration, skylights, and floors)

Doors are treated as fenestration in REScheck

| Assembly | Gross Area or Perimeter | Cavity R-Value | Cont. R-Value | Prop. U-Factor | Req. U-Factor | Prop. UA | Req. UA |
|---|-------------------------|----------------|---------------|----------------|------------------------|----------|------------------|
| Window 4: Metal Frame Orientation: Front | 16 | | | 0.250 | 0.320 0.270 | 4 | 5 4.3 |
| Floor 1: All-Wood Joist/Truss | 3,000 | 35.0 | 0.0 | 0.028 | 0.033 0.026 | 84 | 99 78 |
| Basement: Solid Concrete or Masonry Orientation: Unspecified Wall height: 8.0' Depth below grade: 7.0' Insulation depth: 7.0' | 1,000 | 0.0 | 15.0 | 0.050 | 0.050 | 50 | 50 |

Additional Efficiency Package selected DOES NOT count toward compliance with Section 408 of the 2022 Denver Energy Code

Additional Efficiency Package(s)

Required: 1 Proposed: 1

| Description | Credits |
|----------------------------|---------|
| Efficient HVAC Performance | 1.0 |

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2021 IECC requirements in REScheck Version : REScheck-Web and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.

Name - Title Signature Date

Step 1b. Select "Efficiency HVAC Performance" (does not impact UA calculations)