# 2021 IECC RESIDENTIAL CODE ADOPTION

## Changes Affecting Thermal Insulation & Air Barriers

Every three years, the International Codes Council updates the model building codes. In 2021, changes were published for the International Residential Code (IRC), International Building Code (IBC), and the International Energy Conservation Code (IECC). Based on 2021 IECC Residential Provisions, there are significant changes for both thermal insulation and air barriers compared to 2018 IECC requirements as outlined below.

| Code Section | Description of Change |
|---|---|
| **WOOD FRAME WALL R-VALUE**<br>**Table R402.1.3** | Increases R-value requirements in climate zones 4 and 5 |
| **SLAB R-VALUE**<br>**Table R402.1.3** | Increases slab insulation R-value requirements and depth in climate zones 3-5 to R-10 continuous insulation and 4 feet |
| **CEILING R-VALUE**<br>**Table R402.1.3** | • CZ 2-3: increases from R39 to R49<br>• CZ 4-8: increases from R49 to R60<br>• A continuous layer of R49 may be substituted for R60 in ceilings if installed over 100% of the ceiling and wall top plate at eaves |
| **ADDITIONAL EFFICIENCY PACKAGE**<br>**R408 & R401.2.5** | A new section was added for Additional Efficiency Package Options to reduce energy use. Builders must achieve an additional 5% energy savings by selecting one of five options: enhanced envelope insulation; more efficient HVAC equipment; reduced energy use in service water-heating; more efficient duct thermal distribution system; improved air sealing |
| **AIR LEAKAGE**<br>**R402.4.1.2 & R402.4.1.3** | • Set a maximum air leakage of 5.0 ACH50 or 0.28 CFM/SF Enclosure Area<br>• CZ 0-2: air leakage rate not exceeding 5.0 ACH<br>• CZ 3-8: air leakage rate not exceeding 3.0 ACH<br>• Allows for 0.30 CFM/SF Enclosure Area for attached dwelling units and buildings that are 1,500 SF or smaller |

Adapted from *Energy Savings Analysis: 2021 IECC for Residential Buildings*

## Table R42.1.3 Insulation Minimum R-Values and Fenestration Requirements by Component

| Code Section | Ceiling R-Value | Wood Frame Wall R-Value | Mass Wall R-Value | Floor R-Value | Basement Wall R-Value | Slab R-Value & Depth | Crawl Space Wall R-Value |
|---|---|---|---|---|---|---|---|
| 0 | 30 | 13 or 0 & 10ci | 3/4 | 13 | 0 | 0 | 0 |
| 1 | 30 | 13 or 0 & 10ci | 3/4 | 13 | 0 | 0 | 0 |
| 2 | 49 | 13 or 0 & 10ci | 4/6 | 13 | 0 | 0 | 0 |
| 3 | 49 | 20 or 13 & 5ci or 0 & 15ci | 8/13 | 19 | 5ci or 13 | 10ci, 2ft | 5ci or 13 |
| 4 except Marine | 60 | 30 or 20 & 5ci or 13 & 10ci or 0 & 20ci | 8/13 | 19 | 10ci or 13 | 10ci, 4ft | 10ci or 13 |
| 5 and Marine 4 | 60 | 30 or 20 & 5ci or 13 & 10ci or 0 & 20ci | 13/17 | 30 | 15ci or 19 or 13 & 5ci | 10ci, 4ft | 15ci or 19 or 13 & 5ci |
| 6 | 60 | 30 or 20 & 5ci or 13 & 10ci or 0 & 20ci | 15/20 | 30 | 15ci or 19 or 13 & 5ci | 10ci, 4ft | 15ci or 19 or 13 & 5ci |
| 7 & 8 | 60 | 30 or 20 & 5ci or 13 & 10ci or 0 & 20ci | 19/21 | 38 | 15ci or 19 or 13 & 5ci | 10ci, 4ft | 15ci or 19 or 13 & 5ci |

Adapted from 2021 International Energy Conservation Code "5ci or 13" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "10ci or 13" means R-10 ci; R-13 cavity insulation. "15ci or 19 or 13&5ci" means R-15 ci; R-19 cavity insulation or R-13 cavity and 5ci.

Denotes the changes from 2018 IECC provisions

## THE SPRAY FOAM ADVANTAGE

Spray foam insulation has significant advantages over other insulation systems. It weatherizes homes by acting as both insulation and an air barrier. This means it helps control the flow of water, air, vapor, and thermal energy in and out of a building.

### Spray foam makes it easier for builders to achieve 2021 IECC Residential Provisions.

- **Efficient:** Offers one of the highest R-values per inch enabling R-30 wall cavities with 2" x 6" framing and maximizes space utilization in finished basements.
- **Simple:** Eliminates additional air sealing products and steps as well as the need for exterior continuous insulation
- **Flexible:** Creates cost-effective hybrid wall and ceiling assemblies when used with other types of insulation
- **Resilient:** Improves strength of walls and roofs to better endure natural disasters when closed-cell spray foam is installed

## OPEN CELL

| SEALTITE™ PRO OPEN CELL | | SEALTITE™ PRO NO TRIM 21 | |
|---|---|---|---|
| THICKNESS (INCHES) | R-VALUE (°F·ft² · h/BTU) | THICKNESS (INCHES) | R-VALUE (°F·ft² · h/BTU) |
| 1 | 3.7 | 1 | 4.4 |
| 3.5 | 13 | 3.5 | 15 |
| 4 | 15 | 4 | 17 |
| 5.5 | 20 | 5.5 | 23 |

### PERFORMANCE FEATURES

- Air impermeable
- Does not sustain mold growth
- Excellent sound attenuation
- Cost-effective

### USES

- Exterior wall cavities
- Between floors
- Interior walls
- Ceiling and roof

## CLOSED CELL

| SEALTITE™ PRO CLOSED CELL | | SEALTITE™ PRO HFO | |
|---|---|---|---|
| THICKNESS (INCHES) | R-VALUE (°F·ft² · h/BTU) | THICKNESS (INCHES) | R-VALUE (°F·ft² · h/BTU) |
| 1 | 6.9 | 1 | 7.2 |
| 3.5 | 24 | 3.5 | 25 |
| 4 | 28 | 4 | 29 |
| 5.5 | 38 | 5.5 | 40 |

### PERFORMANCE FEATURES

- Air impermeable
- Structural enhancement and impact resistance
- Vapor and bulk water barrier
- High R-value (thinner wall)

### USES

- Exterior wall cavities
- Between floors
- Celling and roof
- Above- and below-grade exterior applications
- Continuous insulation
- Under-slab insulation

## CONTACT CARLISLE SPRAY FOAM INSULATION FOR MORE INFORMATION.

The Carlisle Spray Foam Insulation (CSFI) team is here to help you stay current on the latest building codes and review how spray foam insulation can cost-effectively be incorporated into your energy efficient homes.

[i]Salcido, V. R., Chen, Y., Xie, Y., & Taylor, Z. T. (221AD, July). Energy Savings Analysis: 2021 IECC for Residential Buildings. Retrieved November 16, 2022, from https://www.energycodes.gov/sites/default/files/2021-07/2021_IECC_Final_Determination_AnalysisTSD.pdf

[ii]International Code Council. (2021, September). 2021 International Energy Conservation Code (IECC). Retrieved November 16, 2022, from https://codes.iccsafe.org/content/IECC2021P2/iecc-residential-provisions

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