

2021 INTERNATIONAL ENERGY CONSERVATION CODE SIGNIFICANT CHANGES



The City of McKinney is planning to change from the 2018 to the 2021 Edition of the International Energy Conservation Code (IECC) January 1, 2023. The following are significant changes to the IECC and its proposed amendments. The full text of the code is available through [ICC](#), and the proposed amendments are available through the North Central Texas Council of Governments ([NCTCOG](#)).

RESIDENTIAL PROVISIONS:

- **R103.2 – Information on construction documents**
 - **Modification:** Must declare compliance path on construction documents

- **R202 – Definition: Thermal Distribution Efficiency (TDE)**
 - **Addition:** TDE is a heat loss calculation measuring the difference between air duct inlet and outlet temperatures, expressed as a percentage.

- **R301.1 – Climate zones**
 - McKinney is not affected by changes in climate zone boundaries in North Texas

- **R401.2 – Compliance paths (amended by NCTCOG)**
 - **Modification:** Clarified the names of and more thoroughly defined the compliance paths, being the Prescriptive Compliance Option, the Total Building Performance Option, the Energy Rating Index (ERI) Option, the Tropical Climate Region Option, and the Additional Energy Efficiency Option. (Note: The Additional Energy Efficiency option has been deleted in its entirety by a NCTCOG amendment.)

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- **R401.3 – Thermal envelope certificate**
 - **Modification:** Requirements have been expanded for a permanent certificate showing building envelope energy values, now including the code edition, compliance path, ERI, and photovoltaic systems, if any.
- **R402.1.2 – Insulation and fenestration criteria**
 - **Modification:** U-factor is established as the primary measure of insulation, and R-value is an alternative.
- **Table R402.1.2 – Insulation and fenestration U-factors (amended by NCTCOG)**

Climate Zone	Fenestration U-Factor ^f	Ceiling U-Factor
2	.40	0.26 0.29
3	0.30 0.32	0.26 0.29

- **Table R402.1.3 – Insulation minimum R-values (amended by NCTCOG)**

Climate Zone	Fenestration U-Factor ^{b,i}	Ceiling R-Value	Wood Frame Wall R-Value	Slab R-Value & Depth
2	.40	49 42	13 or 0 + 10	0
3	0.30 0.32	49 42	19 or 13+53ci, 0+15	10ci, 2-ft 0

- **R402.2.4 – Access hatches and doors**
 - **Modification:** Attic access doors shall be at least R-10 and must be weatherstripped.
- **R402.2.4.1 – Insulation retention at hatches and doors**
 - **Modification:** Install dams or baffles to keep loose attic insulation from spilling over into attic access hatches or settling over the edge of changes in ceiling level in the attic.
- **R402.4.1.2 – Air leakage testing**
 - **Modification:** New definition for Dwelling Unit Enclosure Area – sum of the areas of all interior surfaces bordering unconditioned space
 - Maximum air leakage rate for Climate Zone 3 is now 3 ACH using the Prescriptive compliance path, and 5 ACH or 0.28 CFM per square foot of dwelling unit enclosure area for all other compliance paths
 - By NCTCOG amendment, sampling is allowed for R2 multifamily dwelling units

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- **R403.3.2(3) – Ductwork in floor cavities located over unconditioned space**
 - **Modification:** Where there is a conditioned room over a garage, in order for ductwork in the floor cavity to be considered within conditioned space, an air barrier and minimum R-19 insulation is required.

- **R403.3.5 – Duct testing**
 - **Modification:** Ducts in conditioned spaces are no longer exempt from duct testing

- **R403.6.3 – Mechanical ventilation system testing**
 - **Addition:** Testing is required to verify that the ventilation rate is as intended by code and by the system’s ratings
 - By NCTCOG amendment, sampling is allowed for units in a multifamily building

- **R404.2 – Interior lighting controls (amended by NCTCOG)**
 - **Addition:** The IECC added a new requirement for permanent interior light fixtures to be controlled by either a dimmer, an occupant sensor, or other control. However, this requirement been deleted in its entirety by a NCTCOG amendment.

- **R404.3 – Exterior lighting controls**
 - **Addition:** Exterior lighting must have a manual on/off switch and a daylight sensor

- **R405.2 – Performance-based compliance (amended by NCTCOG)**
 - **Addition:** This pertains to the Total Building Performance compliance option. The code eliminates the terms “mandatory” and “prescriptive.” Table R405.2 lists the requirements of this path.
 - (3) is amended to say the annual energy cost that is less than or equal to the annual cost of the 2021 standard reference design or 8% less than the annual energy cost of the 2018 standard reference design

- **Table R406.4 – ERI compliance (amended by NCTCOG)**

TABLE R406.4 (N1106.4) ²
MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX
2	52-59
3	52-59

² The table is effective from September 1, 2022 to August 31, 2025.

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- **R408 – Additional efficiency package options (amended by NCTCOG)**
 - Additional efficiency package options for buildings using the Prescriptive path to residential energy code compliance have been deleted by amendment – this section has been deleted in its entirety by a NCTCOG amendment

COMMERCIAL PROVISIONS:

- **C103.2 - Information on construction documents**
 - **Modification:** Start out by declaring what compliance path is used
 - Additional required details about air barrier and air sealing
- **C202 – Definitions of fan efficiencies**
 - **Addition:** New definitions added to correspond with new fan regulations, including embedded fan, fan array, fan energy index (FEI), fan nameplate electrical input power, and fan system electrical input power
- **C301.1 – Climate zones**
 - McKinney is not affected by changes in climate zone boundaries in North Texas
- **C401.2.1 – Compliance paths**
 - **Modification:** Outlines the compliance paths for commercial buildings: Prescriptive Compliance, Total Building Performance, and ASHRAE 90.1
- **C401.3 – Thermal envelope certificate**
 - **Addition:** Required to post a permanent certificate showing building envelope R-values, U-factors, SHGC, and air leakage ratings
- **Table C402.1.3 – Minimum R-Values**

<i>Climate Zone</i>	<i>Fenestration U-Factor^{b,i}</i>	<i>Ceiling R-Value</i>	<i>Wood Frame Wall R-Value</i>	<i>Slab R-Value & Depth</i>
2	.40	49-42	13 or 0 + 10	0
3	0.30 0.32	49-42	19 or 13+53ci, 0+15	10ci, 2-ft 0

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- **Table C402.4 – U-Factor and SHGC requirements**

<i>Climate Zone</i>	<i>Fenestration U-Factor^f</i>	<i>Ceiling U-Factor</i>
2	.40	0.26-0.29
3	0.30 0.32	0.26-0.29

- **C402.5 – Air leakage**

- **Modification:** Revised air barrier details
- Inspection and commissioning provisions for air barrier installation
- Sampling allowed for air testing dwelling units in multi-family buildings with more than 8 units – 20%, but no less than 7 units must be tested – must include a middle floor unit by NCTCOG amendment
- Commercial buildings under 5000 sq ft can be tested like residential buildings with a maximum leakage rate set at 0.30 cfm/ft² at 0.2 in. w.g.
- In general, commercial buildings are to be tested to a maximum air leakage of 0.40 cfm/ft² at a pressure differential of 0.3 in. w.g.
- If portions of the building are tested at a time, an area-weighted average is taken based on the exposed exterior surface area of each portion
- New language includes provisions for finding and mitigating leakage if the leakage test exceeds the allowed threshold

- **C402.5.11 – Operable openings interlocking**

- **Addition:** Openings to the outdoors greater than 40 sq ft, such as a roll-up patio door at a restaurant, must be interlocked with the HVAC controls
- Within 10 minutes of opening, the cooling system setpoint changes to 90 degrees or the heating setpoint changes to 55 degrees
- Exceptions include separately zoned food prep areas, vestibules, and warehouses that routinely use overhead doors

- **C403.4.2.3 – Automatic start and stop**

- **Modification:** HVAC controls must be programmable with an automatic start and stop (additional of stop time is new).

- **C403.8.3 – Fan efficiency**

- **Modification:** A new way of rating fan efficiency, the Fan Energy Index (FEI), along with some new definitions of types of fans, impose new efficiency standards on many types of fans. Fans and fan arrays are to be rated as such by an independent testing agency in accordance with AMCA 208 and labeled by the manufacturer. Multiple exceptions are given.

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- **C405.2.1.2 – Occupant sensor controls for warehouse storage areas**
 - **Clarification:** Lighting for each warehouse aisleway should be controlled by occupant sensors independent from other areas
 - Controls must reduce lighting by at least 50% within 20 minutes of sensors detecting no occupants
 - Need to know rack layout before final electrical inspection
- **C405.2.8 – Parking garage lighting controls**
 - **Addition:** New provisions for occupant sensing or time switch controls in parking garages
 - Establishes lighting zones not to exceed 3600 sq ft
 - Specifies reductions in lighting after 20 minutes
 - Includes provisions for perimeter daylight zones
- **C405.11 – Automatic receptacle control**
 - **Addition:** 50% of receptacles and 25% of branch circuit feeders must be connected to automatic controls. This includes offices, workstations, break rooms, conference rooms, classrooms, copy rooms, and the like.
- **C405.12 – Energy monitoring**
 - **Amendment:** The requirement for new buildings with a conditioned area over 25,000 sq ft to be equipped with a way of metering power consumption for various building loads has been deleted by amendment.
- **C406 – Energy efficiency credits for the Prescriptive Compliance path**
 - **Modification:** Must earn at least ten credits from a choice of eleven options
 - One point is earned through every 0.25% of building energy cost savings
 - Options include more efficient HVAC systems, reduced lighting power, enhanced lighting controls, on-site supply of renewable energy, dedicated outdoor air system for certain HVAC equipment, efficient service water heating equipment, enhanced envelope performance, reduced air infiltration, energy monitoring, fault detection and diagnostic systems, and efficient kitchen equipment
 - Includes new HVAC credit options
 - Lighting reduction options have been expanded
 - Revised credit options for renewable energy, energy recovery, and energy monitoring
 - Options for more efficient kitchen equipment
- **Table C407.2 – Requirements for Total Building Performance**
 - New table outlines all of the required code sections for the Total Building Performance compliance path

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