

Exhibit C

Recommended Amendments to the 2018 International Energy Conservation Code North Central Texas Council of Governments Region (Climate Zone 3 of the IECC)

The following sections, paragraphs, and sentences of the 2018 International Energy Conservation Code (IECC) are hereby amended as follows:

Section C102/R102 General; add Section C102.1.2 and R102.1.2 to read as follows:

C102.1.2 Alternative compliance. A building certified by a national, state, or local accredited energy efficiency program and determined by the Energy Systems Laboratory to be in compliance with the energy efficiency requirements of this section may, at the option of the Code Official, be considered in compliance. The United States Environmental Protection Agency's Energy Star Program certification of energy code equivalency shall be considered in compliance.

R102.1.2 Alternative compliance. A building certified by a national, state, or local accredited energy efficiency program and determined by the Energy Systems Laboratory to be in compliance with the energy efficiency requirements of this section may, at the option of the Code Official, be considered in compliance. The United States Environmental Protection Agency's Energy Star Program certification of energy code equivalency shall be considered in compliance. Regardless of the program or the path to compliance, each 1- and 2-family dwelling shall be tested for air and duct leakage as prescribed in Section R402.4.1.2 and R403.3.3 respectively.

Section R202 Definitions; add the following definition:

PROJECTION FACTOR. The ratio of the horizontal depth of the overhang, eave or permanently attached shading device, divided by the distance measured vertically from the bottom of the fenestration glazing to the underside of the overhang, eave or permanently attached shading device.

Section R202 Definitions; add the following definition:

DYNAMIC GLAZING. Any fenestration product that has the fully reversible ability to change its performance properties, including *U*-factor, solar heat gain coefficient (SHGC), or visible transmittance (VT).

Table 402.1.2 (N1102.1.2) INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT; the Fenestration U-factor for Climate Zone 3 is amended as follows:

CLIMATE ZONE	FENESTRATION U-FACTOR
3	0.35

Table 402.1.4 EQUIVALENT U-FACTORS; the Fenestration U-factor for Climate Zone 3 is amended as follows:

CLIMATE ZONE	FENESTRATION U-FACTOR
3	0.35

Section R402.3.2 Glazed fenestration SHGC; amend by adding a paragraph and table following the exception to read as follows:

Where vertical fenestration is shaded by an overhang, eave, or permanently attached shading device, the SHGC required in Table R402.1.2 shall be reduced by using the multipliers in Table R402.3.2 SHGC Multipliers for Permanent Projections.

Table R402.3.2 SHGC Multipliers for Permanent Projections^a

Projection Factor	SHGC Multiplier (all Other Orientation)	SHGC Multiplier (North Oriented)
0 - 0.10	1.00	1.00
>0.10 – 0.20	0.91	0.95
>0.20 – 0.30	0.82	0.91
>0.30 – 0.40	0.74	0.87
>0.40 – 0.50	0.67	0.84
>0.50 – 0.60	0.61	0.81
>0.60 – 0.70	0.56	0.78
>0.70 – 0.80	0.51	0.76
>0.80 – 0.90	0.47	0.75
>0.90 – 1.00	0.44	0.73

^a North oriented means within 45 degrees of true north.

R402.4.1.2 Testing; add a last paragraph to read as follows:

Mandatory testing shall only be performed by individuals that are certified to perform air infiltration testing certified by national or state organizations as approved by the Building Official. The certified individuals must be an independent third-party entity, and may not be employed; or have any financial interest in the company that constructs the structure.

Section R402.4 Air leakage (Mandatory); add a new section and table to read as follows:

R402.4.1.3 Testing option – ACH tradeoff. As an option to the air leakage rate set out in Section R402.4.1.2, 1- and 2-family homes meeting all of the listed criteria below and the thermal envelope requirements in Table R402.4.1.3 will be considered compliant when tested and verified as having an air leakage rate to not less than or equal to four air changes per hour when tested and reported in accordance with the testing standards and reporting criteria listed in Section R402.4.1.2.

The compliance equivalency is limited as follows:

1. Limited to a conditioned floor area between 1,000 and 6,000 square feet,
2. Limited to between 2 to 6 bedrooms,
3. Assumes all ductwork and mechanical equipment is located in the unconditioned attic,
4. Assumes typical wood framing in the walls and roof, and
5. Assumes one of the following heating/cooling systems:
 - a. All electric system with a heat pump for heating, or
 - b. A system with electric cooling and natural gas heating.

Dwellings using electric resistance strip heating do not qualify for this tradeoff.

TABLE R402.4.1.3 ^a

Envelope Component	Option #1	Option #2
R402.4 Air Leakage	≤ 4 ACH50	≤ 4 ACH50
Wall Insulation <i>R</i> -value	R13 + R3	R13 + R3
Fenestration <i>U</i> -factor	≤ 0.32	≤ 0.32
Fenestration SHGC	≤ 0.25	≤ 0.25
Ceiling <i>R</i> -value	$\geq R49$	$\geq R49$
Duct Insulation <i>R</i> -value	R8	R6
Radiant Barrier Required	No	Yes

^a Except for the values listed in the table, all other mandatory code provisions are applicable.

^b The first value listed is the *R*-value of cavity insulation, the second value is the *R*-value of the continuous insulation or insulated siding.

Section R402.4 Air leakage (Mandatory); add a new section to read as follows:

R402.4.1.4 Testing options for R2 multifamily dwelling units. As an option to the air leakage rate set out in Section R402.4.1.2, multifamily dwelling units will be considered compliant when tested and verified as having an air leakage rate to the air leakage rate set out in either Section R402.4.1.4.1 or Section R402.4.1.4.2 when tested and reported in accordance with the testing standards and reporting criteria listed in Section R402.4.1.2

R402.4.1.4.1 Total air leakage rate for interior multifamily dwelling units. Interior multifamily dwelling units with a measured, “unguarded” total air leakage result of 5.3 ACH50 or less shall be considered compliant.

R402.4.1.4.2 Total air leakage rate for corner multifamily dwelling units. Corner multifamily units with a measured, “unguarded” total leakage result of less than 5.0 ACH50 shall be considered compliant.

Section R402.4 Air leakage (Mandatory); add a new section to read as follows:

R402.4.1.5 Sampling options for R2 multifamily dwelling units. For buildings having three or more dwelling units, a minimum of 15% of the dwelling units in each building must be tested as required by Section R402.4.1.2. Prior to beginning sampling for testing, “Initial Testing” is required for each multifamily property. “Initial Testing” shall consist of the 3rd party testing contractor performing the required tests on at least three consecutive dwelling units. Test results from the “Initial Testing” must satisfy minimum code requirements before sampling is permitted. Dwelling units selected for the “Initial Testing” must be within the same building. Dwelling units selected for “Initial Testing” shall not be included in a “sample group” or counted toward the minimum 15% of dwelling units tested. The building official shall randomly select the three dwelling units for “Initial Testing.” The building official may delegate the random selection to the designated 3rd party testing contractor.

R402.4.1.5.1 Sample group Identification and Sampling. The builder shall identify a “sample group” which may be a building, floor, fire area or portion thereof. All of the dwelling units within the “sample group” must be at the same stage of construction and must be ready for testing. The Building Official shall randomly select at least 15% of dwelling units from each “sample group” for testing. The Building Official may delegate the random selection to the designated 3rd party testing contractor.

If each tested dwelling unit within a “sample group” meets the minimum code requirements, then all dwelling units in the “sample group” are considered to meet the minimum code requirements.

Before a building may be deemed compliant with the testing as required, each “sample group” must be deemed compliant with the minimum code requirements. The sum total of all of the tested dwelling units across all “sample groups” shall not be less than a minimum of 15% of the dwelling units in a building.

R402.4.1.5.2 Failure to Meet Code Requirement(s). If any dwelling units within the identified “sample group” fail to meet a code requirement as determined by testing, the builder will be directed to correct the cause(s) of failure, and 30% of the remaining dwelling units in the “sample group” will be randomly selected for testing by the Building Official, or third-party testing contractor, regarding the specific cause(s) of failure.

If any failures occur in the additional dwelling units, all remaining dwelling units in the sample group must be individually tested for code compliance.

A multifamily property with three failures within a 90-day period is no longer eligible to use the sampling protocol in that community or project until successfully repeating "Initial Testing." Sampling may be reinstated after at least three consecutive dwelling units are individually verified to meet all code requirements.

A Certificate of Occupancy or Building Final may not may be issued for any building until testing has been performed and deemed to satisfy the minimum code requirements on the dwelling unit(s) identified for testing.

R403.3.3 Duct Testing (Mandatory); add a last paragraph to read as follows:

Mandatory testing shall only be performed by individuals that are certified to perform duct testing leakage testing certified by national or state organizations as approved by the building official. The certified individuals must be an independent third-party entity, and may not be employed; or have any financial interest in the company that constructs the structure.

Section R403.3 Ducts; add a new section to read as follows:

R403.3.4.1 Sampling options for R2 multifamily dwelling units. For buildings having three or more dwelling units, a minimum of 15% of the dwelling units in each building must be tested as required by Section R403.3.3. Prior to beginning sampling for testing, “Initial Testing” is required for each multifamily property. “Initial Testing” shall consist of the 3rd party testing contractor performing the required tests on at least three consecutive dwelling units. Test results from the “Initial Testing” must satisfy minimum code requirements before sampling is permitted. Dwelling units selected for the “Initial Testing” must be within the same building. Dwelling units selected for “Initial Testing” shall not be included in a “sample group” or counted toward the minimum 15% of dwelling units tested. The Building Official shall randomly select the three dwelling units for “Initial Testing.” The Building Official may delegate the random selection to the designated 3rd party testing contractor.

R403.3.4.1.1 Sample group Identification and Sampling. The builder shall identify a "sample group" which may be a building, floor, fire area or portion thereof. All of the dwelling units within the “sample group” must be at the same stage of construction and must be ready for testing. The Building Official shall randomly select at least 15% of dwelling units from each “sample group” for testing. The Building Official may delegate the random selection to the designated 3rd party testing contractor.

If each tested dwelling unit within a “sample group” meets the minimum code requirements, then all dwelling units in the “sample group” are considered to meet the minimum code requirements.

Before a building may be deemed compliant with the testing as required, each “sample group” must be deemed compliant with the minimum code requirements. The sum total of all of the tested dwelling units across all “sample groups” shall not be less than a minimum of 15% of the dwelling units in a building.

R403.3.4.1.2 Failure to Meet Code Requirement(s). If any dwelling units within the identified “sample group” fail to meet a code requirement as determined by testing, the builder will be directed to correct the cause(s) of failure, and 30% of the remaining dwelling units in the “sample group” will be randomly selected for testing by the Building Official, or third-party testing contractor, regarding the specific cause(s) of failure.

If any failures occur in the additional dwelling units, all remaining dwelling units in the sample group must be individually tested for code compliance.

A multifamily property with three failures within a 90-day period is no longer eligible to use the sampling protocol in that community or project until successfully repeating "Initial Testing." Sampling may be reinstated after at least three consecutive dwelling units are individually verified to meet all code requirements.

A Certificate of Occupancy or Building Final may not may be issued for any building until testing has been performed and deemed to satisfy the minimum code requirements on the dwelling unit(s) identified for testing.

Section C402.2/R402.2 Specific insulation requirements (Prescriptive); add Section C402.2.8 and R402.2.14 to read as follows:

Section C402.2.8/R402.2.14 Insulation installed in walls. Insulation installed in walls shall be totally enclosed on all sides consisting of framing lumber, gypsum, sheathing, wood structural panel sheathing or other equivalent material approved by the Building Official.

Section C403.7.4 Energy recovery ventilation systems (Mandatory); add exception #12 to read as follows:

12. Individual ventilation systems that serve an individual dwelling unit or sleeping unit.

Section C403.11.1 Duct and Plenum Insulation and Sealing (Mandatory); is amended by adding a second paragraph to read as follows:

Environmental ducts and plenums installed in vertical chases, both supply and exhaust, where the ducts or plenums will not be accessible after construction completion, shall be leak tested in accordance with the SMACNA HVAC Air Leakage Test Manual to the installed ductwork class and pressure requirements.

Documentation shall be furnished demonstrating that representative sections totaling not less than 25 percent of the duct area have been tested and that all tested sections comply with the requirements of this section.

Section 405.2; add the exception to read as follows:

Section 405.2 Mandatory requirements. Compliance with the section requires that the mandatory provisions identified in Section 401.2 be met. Supply and return ducts not completely inside the building thermal envelope shall be insulated to an R-value of not less than R-6.

Exceptions:

1. For one and two family dwellings the maximum envelope leakage of 4 ACH50 is permitted provided the envelope leakage in the Standard Reference Design is 3 ACH50 and all other requirements of Section R405 are met, including all other mandatory measures. The annual energy cost or source energy usage of the Proposed Design must be equal to or less than that of the Standard Reference Design.
2. For multifamily or townhomes and buildings classified as Group R2 and Group R4 of three stories or less the maximum envelope leakage of less than 5 ACH50 is permitted provided the envelope leakage in the Standard Reference Design is 3 ACH50 and all other requirements of Section R405 are met, including all other mandatory measures. The annual energy cost or source energy usage of the Proposed Design must be equal to or less than that of the Standard Reference Design.

Section R405.6.2 (N1105.6.2); add the following sentence to the end of paragraph:

Acceptable performance software simulation tools may include, but are not limited to, REM Rate™; Energy Gauge®; ICF International Beacon Residential; Ekotrope, HERS Module; Right-Energy HERS and IC3. Other performance software programs as listed by RESNET® and having the ability to provide a report as outlined in R405.4.2 may also be deemed acceptable performance simulation programs and may be considered by the Building Official.

Section C405.9. Voltage drop in feeders; deleted in its entirety.

TABLE R406.4 (N1106.4) MAXIMUM ENERGY RATING INDEX; amend to read as follows:

**TABLE R406.4¹
MAXIMUM ENERGY RATING INDEX**

CLIMATE ZONE	ENERGY RATING INDEX
3	65

¹ This table is effective until August 31, 2019.

**TABLE R406.4²
MAXIMUM ENERGY RATING INDEX**

CLIMATE ZONE	ENERGY RATING INDEX
3	63

² The table is effective from September 1, 2019 to August 31, 2022.

**TABLE R406.4³
MAXIMUM ENERGY RATING INDEX**

CLIMATE ZONE	ENERGY RATING INDEX
3	59

³ This table is effective on or after September 1, 2022.

Section C408.3.1 Functional Testing; amend to read as follows:

C408.3.1 Functional Testing. Prior to passing final inspection, the registered design professional or approved agency shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's instructions. Functional testing shall be in accordance with Sections C408.3.1.1 through C408.3.1.3 for the applicable control type.

END