ORDINANCE NO. 212, 2025
OF THE COUNCIL OF THE CITY OF FORT COLLINS
AMENDING CHAPTER 5, ARTICLE II, DIVISION 2 OF THE CODE
OF THE CITY OF FORT COLLINS FOR THE PURPOSE OF REPEALING THE 2021
INTERNATIONAL ENERGY CONSERVATION CODE AND ADOPTING THE
2024 INTERNATIONAL ENERGY CONSERVATION CODE, WITH AMENDMENTS

A. Since 1924, the City has reviewed, amended and adopted the latest nationally recognized building standards available for the times; and

B. Upon recommendation of City staff, the City Council has determined that it is in the best interests of the City to align eleven interconnected basic construction codes under one publication year; and

C. The eleven interconnected basic construction codes are the *International Building Code, International Residential Code, International Mechanical Code, International Fuel Gas Code, International Energy Conservation Code, International Property Maintenance Code*, *International Swimming Pool and Spa Code, International Existing Building Code, International Plumbing Code*, *International Fire Code*, and the *International Wildland-Urban Interface Code* to the extent adopted by the *Colorado Wildfire Resiliency Code*.

D. The City Council has determined that the 2024 publication year of these interconnected basic construction codes should be adopted and that any counterpart *International* codes previously adopted should be repealed, both to align the publication years of the codes and because the 2024 publications contain improvements in construction code regulation.

E. City staff has conducted a significant public outreach program, working with the regulated construction industry and building professionals.

F. The adoption of the interconnected basic construction codes has been presented to community groups and feedback has been received from the Water Commission, Energy Board, Commission on Disability, Natural Resource Advisory Board, Poudre Fire Authority Board, Building Review Commission, Affordable Housing Board, and Air Quality Advisory Board.

G. The City Council has determined that it is in the best interest of the health, safety and welfare of the City and its citizens that the *2024 International Energy Conservation Code* be adopted, with local amendments as set forth in this Ordinance.

H. Pursuant to the City Charter Article II, Section 7, City Council may enact any ordinance which adopts a code by reference in whole or in part provided that before adoption of such ordinance the Council hold a public hearing thereon and that notice of the hearing shall be published twice in a newspaper of general circulation published in the City, with one of such publications occurring at least eight (8) days preceding the

hearing and the other publication occurring at least fifteen (15) days preceding the hearing.

I. In compliance with City Charter, Article II, Section 7, the City Clerk published in the Fort Collins *Coloradoan* such notice of hearing concerning adoption of the 2024 International Codes on November 16, 2025, and November 23, 2025.

J. Attached as Exhibit A and incorporated herein by reference is the Notice of Public Hearing dated November 16, 2025, that was so published and which the Council hereby finds meets the requirements of Article II, Section 7 of the City Charter.

K. Attached as Exhibit B and incorporated herein by reference is the *City of Fort Collins Building Code Residential Air Tightness Testing Protocol, New Attached and Detached Single Family Dwellings*, dated December 16, 2025, which is referenced in Paragraph 84 of Section 3 of this Ordinance, regarding IECC Section R402.5.1.2.

L. Attached as Exhibit C and incorporated herein by reference is the *City of Fort Collins New Multifamily Air Tightness Testing Protocol*, dated December 16, 2025, which is referenced in Paragraph 25 of Section 3 of this Ordinance, regarding IECC Section C402.6.2.2.

In light of the foregoing recitals, which the Council hereby makes and adopts as determinations and findings, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. The City Council hereby repeals the 2021 *International Energy Conservation Code* ("IECC") and adopts the 2024 IECC as amended by this Ordinance.

Section 2. Section 5-26(b) of the Code of the City of Fort Collins is hereby amended to read as follows:

> (b) Pursuant to the power and authority conferred on the City Council by Colorado Revised Statutes Section 31-16-202 and Article II, Section 7 of the Charter, the City Council has adopted the *2024 International Energy Conservation Code* published by the International Code Council, first printing (August 2025 update), as amended by the City, which shall have the same force and effect as though set forth in full herein and which shall apply exclusively to the design and construction of all buildings that are classified as residential buildings not more than three (3) stories above grade and their systems; new portions of such existing buildings and their systems; and new systems and equipment in such existing buildings, exclusive of detached one- and two-family dwellings, multiple single-family dwellings (townhouses), for the purpose of establishing minimum requirements for minimum energy efficiency. As provided in the *2024 International Energy Conservation Code*, Appendices are not adopted except as expressly set forth in § 5-31.

Section 3. Section 5-31 of the Code of the City of Fort Collins is hereby repealed and re-enacted to read as follows:

Sec. 5-31. Amendments and deletions to the 2024 International Energy Conservation Code.

The *2024 International Energy Conservation Code* adopted in § 5-26(b) is amended as follows:

1. **Section C101.1 Title** is amended to read as follows:

   C101.1 Title. This code shall be known as the *Energy Conservation Code* of the City of Fort Collins and shall be cited as such. It is referred to herein as "this code."

2. **Section C102.4 Referenced codes and standards** is amended to read as follows:

   C102.4 Referenced codes and standards. The codes and standards referenced in this code shall be those listed in Chapter 6 of this code and those listed in Section 101.4 of the adopted *International Building Code*, entitled "Referenced Codes," and such codes and standards shall be considered as part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections C102.4.1 and C102.4.2.

3. **SECTION C103 CODE COMPLIANCE AGENCY** is deleted in its entirety and replaced with the following:

   SECTION C103 CODE ADMINISTRATION

   C103.1 Entity charged with code administration. The entity charged with code administration shall be as determined in accordance with Section 103 of the adopted *International Building Code*, entitled "CODE ADMINISTRATION."

   C103.2 Permits. Procedures related to permits, required inspections, payment of fees and obtaining required approvals shall be as set forth in Chapter 1 of the adopted *International Building Code*.

4. **Section C105.2 Information on construction documents** is amended by adding at the end the following new items:

   . . .

   19. Location and size of the *solar-ready zone*, structural design loads and roof dead load and roof live load, and pathways for routing of conduit from the *solar-ready zone* to the electrical service panel.
   20. Locations for condensate drainage where *combustion equipment* for space heating and water heating is installed.

5. **SECTION C106 FEES** is deleted in its entirety and replaced with the following:

SECTION C106 FEES

C106.1 Fees. All items relating to fees shall be as specified in Section 109 of the adopted *International Building Code*, entitled “Fees.”

6. **Section C107.2.2 Building thermal envelope** is amended to read as follows:

C107.2.2 Building thermal envelope. Inspections shall verify the type of insulation, *R*-values, location of insulation, *thermal bridge mitigation, fenestration, U-factor*, SHGC and VT, and that *air leakage* controls are installed, as required by the code, *approved* plans and specifications. At the request of the *code official* a letter of proof, or intent to contract with an approved third party air leakage test agency describing the air barrier inspection sequencing shall be provided to the *code official* prior to completion of rough framing or insulation inspections and shall be signed by the building owner or the building owner’s representative.

7. **SECTION C109 MEANS OF APPEALS** is deleted in its entirety and replaced with the following:

SECTION C109 MEANS OF APPEALS

C109.1 Means of appeals. Appeals of decisions, determinations and interpretations of this code shall be made pursuant to the applicable provisions of Section 113 of the adopted *International Building Code*, entitled “MEANS OF APPEALS.”

8. A new **SECTION C111 WAIVERS** is added to read as follows:

SECTION C111 WAIVERS

C111.1 Scope. The following waivers shall be permitted to be requested if buildings meet the requirements of Section C111.2.

C111.2 Buildings Impacted by a Natural Disaster. The *code official* is permitted to authorize, upon appeal in specific cases, a waiver from the requirements of Section C410 where, owing to a declared natural disaster that has destroyed *buildings* or resulted in other exceptional and extraordinary circumstances as determined by the *code official*, and the *code official* determines enforcement of the provisions of Section C410 will result in unnecessary hardship.

9. A new **SECTION C112 VIOLATIONS** is added to read as follows:

SECTION C112 VIOLATIONS

C112.1 Violations. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who alters or repairs a *building* or structure in violation of the approved construction documents or directive of the *code official*, or of a permit or certificate issued under the provisions of this code, commits a civil infraction and is subject to the provisions contained in § 1-15(f) of the City Code. Each day that a violation continues shall be deemed a separate offense.

10. **SECTION C202 GENERAL DEFINITIONS** is amended to modify or add, in alphabetical order, the following definitions:

. . .

ALL-ELECTRIC BUILDING. A *building* that has no natural gas or propane plumbing installed within the *building*, and that uses electricity as the sole source of energy for its space heating and cooling, water heating (including pools and spas), cooking appliances, and clothes drying appliances. *All-electric buildings* may include solar thermal water and pool heating.

. . .

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative. The term *code official* is interchangeable with the term *building official*.

. . .

COMBUSTION EQUIPMENT. Any equipment or appliance used for space heating, service water heating, cooking, clothes drying, or lighting that uses *fuel gas* or *fuel oil*.

. . .

CONTINUOUS AIR BARRIER. The combination of interconnected materials, assemblies, and flexible sealed joints and components of the *building thermal envelope* that provides air tightness to a specified permeability.

. . .

CORE AND SHELL. The first phase of a commercial project that has the outer building envelope constructed and may contain interior lighting and heating and has not received a permanent Certificate of Occupancy.

. . .

ELECTRIC HEAT. An indoor environmental primary heat source that is a ground-source electric heat pump or a cold climate heat pump specifically designed to

heat at the Winter Outdoor, Design Dry-Bulb temperature for Climate Zone 5b as determined by Section C302.1. The heat pump system shall not be gas or propane fuel fired.

. . .

FIRST TENANT FINISH. The first build-out of a space in a *core and shell* that is credited towards meeting the requirements of this code.

. . .

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas, or mixture of these gases.

FUEL OIL. Kerosene or any hydrocarbon oil having a flash point of not less than 100°F (38°C).

FUTURE ELECTRIC EQUIPMENT. Equipment or appliances necessary to support future all-electric space heating, water heating, cooking, or clothes drying.

. . .

MULTI ZONE BUILDING. Building or enclosure that consists of more than one occupancy class or rating separated by a boundary layer designed to control the movement of air between the different zones.

. . .

11. **Section C302.1 Interior design conditions** is deleted in its entirety and replaced with the following:

C302.1 Exterior and interior local design parameters. The following thermal design parameters, in °F, shall be used for mechanical load calculations and designs and shall be shown on construction documents**:**

Winter Outdoor, Design Dry-bulb = 6
Winter Indoor, Design Dry-bulb = 72
Summer, Outdoor Design Dry-bulb = 91
Summer, Indoor Design Dry-bulb = 75
Summer, Outdoor Design Wet-bulb = 62
Summer, Indoor Design Wet-bulb = 62

12. **Section C401.2.1 International Energy Conservation Code** is amended to read as follows:

C401.2.1 International Energy Conservation Code. *Commercial buildings* shall comply with Appendix CZ and one of the following:

1. Prescriptive Compliance. The Prescriptive Compliance option requires compliance with Sections C402 through C406 and Section C408. *Dwelling units* and *sleeping units* in Group R-2 buildings shall be deemed to be in compliance with this chapter, provided that they comply with Section R406.
2. *Simulated Building Performance*. The *Simulated Building Performance* option requires compliance with Section C407.
3. Integrated Design Assistance. The Integrated Design Assistance option requires compliance with Section C411.

Exception: *Additions, alterations, repairs* and changes of occupancy to existing buildings complying with Chapter 5.

13. **Section C401.2.2 ASHRAE 90.1** is deleted in its entirety.

14. **Section C402.1.1.3 Equipment buildings** is amended to read as follows, with item #5 being deleted in its entirety:

C402.1.1.3 Equipment and maintenance buildings. *Buildings* that comply with the following shall be exempt from the *building thermal envelope* provisions of this code:

1. Are separate *buildings* with floor area not more than 1,200 square feet (111 m2).
2. Are intended to house either electric equipment with installed equipment power totaling not less than 7 watts per square foot (75 W/m^2) or maintenance equipment, and are not intended for human occupancy.
3. Have a heating system capacity not greater than 17,000 Btu/h (5 kW) and a heating *thermostat* setpoint that is restricted to not more than 50°F (10°C) and have permanent signage installed at the thermostat identifying the thermostat setpoint limitation.
4. Have an average wall and roof *U*-factor less than 0.2 in Climate Zones 1 through 5 and less than 0.12 in Climate Zones 6 through 8.

15. A new **Section C402.1.1.4 Seasonally-occupied restrooms** is added to read as follows:

C402.1.1.4 Seasonally-occupied restrooms. *Buildings* that comply with the following shall be exempt from the *building thermal envelope* provisions of this code:

1. Are primarily intended for use as restrooms.

2. Are not intended for occupancy during the period from November through March.
3. Are separate *buildings* with floor area not more than 1,200 square feet (111 m^2).
4. Have a heating system capacity not greater than 17,000 Btu/h (5 kW) and a heating *thermostat* setpoint that is restricted to not more than 50°F (10°C) and have permanent signage installed at the thermostat identifying the thermostat setpoint limitation.
5. Have an average wall and roof *U*-factor less than 0.2.

16. **TABLE C402.1.2 OPAQUE BUILDING THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a,b]** is deleted in its entirety and replaced with the following:

TABLE C402.1.2 OPAQUE BUILDING THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a,b]

CLIMATE ZONE 5	All other	Group R
Roofs		
Insulation entirely above roof deck	U-0.032	U-0.032
Metal buildings	U-0.035	U-0.035
Attic and other	U-0.021	U-0.021
Walls, above grade		
Mass[e]	U-0.067	U-0.067
Metal building	U-0.049	U-0.049
Metal framed	U-0.052	U-0.052
Wood framed and other[i]	U-0.046	U-0.046
Walls, below grade		
Below-grade wall[c]	C-0.092	C-0.092
Floors		
Mass[d]	U-0.057	U-0.051
Floor - steel joist	U-0.029	U-0.029
Wood joist/framing	U-0.027	U-0.027
Slab-on-grade floors		
Unheated slabs[h]	F-0.52	F-0.51

Heated slabs	F-0.62	F-0.62
Opaque doors		
Non-swinging door	U-0.31	U-0.31
Swinging door[f]	U-0.37	U-0.37
Garage door <14% glazing[g]	U-0.31	U-0.31

For SI: 1 pound per square foot = 4.88 kg/m2, 1 pound per cubic foot = 16 kg/m3.

a. Where assembly *U*-factors, *C*-factors and *F*-factors are established in ANSI/ASHRAE/IES 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/IES 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.1.3.4.
e. "Mass walls" shall be in accordance with Section C402.1.3.4.
f. Swinging door *U*-factors shall be determined in accordance with NFRC-100.
g. Garage doors having a single row of fenestration shall have an assembly *U*-factor less than or equal to 0.44 in Climate Zones 0 through 6 and less than or equal to 0.36 in Climate Zones 7 and 8, provided that the fenestration area is not less than 14 percent and not more than 25 percent of the total door area.
h. Vertical insulation located below grade shall be installed in accordance with Section C402.2.4 and shall be extended the distance provided in TABLE C402.1.3 or to top of footing.
i. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.

17. **Section C402.1.2.1.8 Mechanical equipment penetrations** is deleted in its entirety.

18. **TABLE C402.1.3 OPAQUE BUILDING THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, *R*-VALUE METHOD[a]** is deleted in its entirety and replaced with the following:

TABLE C402.1.3
OPAQUE BUILDING THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, *R*-VALUE METHOD[a]

CLIMATE ZONE 5	All other	Group R
Roofs		
Insulation entirely above roof deck	R-30ci	R-30ci
Metal buildings[b]	R-19+R-11 LS	R-19+R-11 LS
Attic and other	R-49	R-49
Walls, above grade		
Mass[f]	R13ci	R-13ci
Metal building	R-13+R-15ci	R-13+R-15ci
Metal framed	R-13+R-10ci	R-13+R-10ci

Wood framed and other[h,i,j]	R-15+R-7.5ci or R-20+5ci	R-15+R-7.5ci or R-20+5ci
Walls, below grade		
Below-grade wall[d]	R-10ci	R-10ci
Floors		
Mass[e]	R-14.6ci	R-16.7ci
Floor - steel joist	R-30+7.5ci	R-30+7.5ci
Wood joist/framing	R-38	R-38
Slab-on-grade floors		
Unheated slabs	R-15 for 24" below	R-20ci for 24" below
Heated slabs[g]	R-15 for 36" below+R-5 full slab	R-15 for 36" below+R-5 full slab
Opaque doors		
Opaque non-swinging doors	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m2, 1 pound per cubic foot = 16 kg/m3.
ci = Continuous Insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA 90.1 Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.2.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted not less than 32 inches on center vertically and not less than 48 inches on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-ft^{2}°F.
d. Where heated slabs are below grade, below-grade walls shall comply with the R-value requirements or above-grade mass walls.
e. "Mass floors" shall be in accordance with Section C402.1.3.4.
f. "Mass walls" shall be in accordance with Section C402.1.3.4.
g. The first value is for perimeter insulation and the second value is for full, under-slab insulation. Perimeter insulation and full-slab insulation components shall be installed in accordance with Section C402.2.4.
h. The first value is cavity insulation; the second value is continuous insulation. Therefore, "R-0 + R-12ci" means R-12 continuous insulation and no cavity insulation; "R-13 + R-3.8ci" means R-13 cavity insulation and R-3.8 continuous insulation; "R-20" means R-20 cavity insulation and no continuous insulation. R-13, R-20 and R-27 cavity insulation, as used in this table, apply to a nominal 4-inch, 6-inch and 8-inch-deep wood or cold-formed steel stud cavities, respectively.
i. Where the required *R*-value in Table C402.1.3 is met by using continuous insulation such that cavity insulation is not required, the *R*-value is applicable to any wall framing spacing.
j. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.

19. **Section C402.1.3.3 Suspended ceilings** is amended to read as follows:

Section C402.1.3.3 Suspended ceilings. Insulation installed on suspended ceilings having removable ceiling tiles shall not be considered part of the minimum thermal resistance (*R-value*) of roof insulation in roof-ceiling construction.

Exception: Suspended ceilings with heated plenums over parking garages where access to mechanical systems is required and that meet the following criteria:

1. Insulation is a minimum of R-19 and is supported in a permanent manner by a support no greater than 24 inches on center.

2. Walls that are part of the building thermal envelope are insulated in accordance with either Table C402.1.2 or Table C402.1.3.
3. The plenum above the parking garage is heated by a heating system whose output capacity does not exceed 12 Btu/h for each square foot.

20. **Section C402.2 Specific insulation and installation requirements** is amended to read as follows:

C402.2 Specific insulation and installation requirements. Insulation in *building thermal envelope* opaque assemblies shall comply with either Sections C402.2.1 through C402.2.7, or an *approved* design and Section C402.2.4 Slabs-on-grade. All insulation shall be installed to meet the requirements of a Grade 1 insulation installation in accordance with Appendix A of ANSI/RESNET/ICC 301.

21. **Section C402.2.4 Slabs-on-grade** is amended to read as follows:

C402.2.4 Slabs-on-grade. The perimeter insulation for slab-on-grade shall be placed on the outside of the foundation or on the inside of the foundation wall and shall be installed as *continuous insulation* and without thermal breaks. Installations shall comply with Table C402.1.3 and the perimeter insulation shall extend downward from the top of the slab for the minimum distance shown in the table or to the top of the footing, whichever is less, or downward to not less than the bottom of the slab and then horizontally to the interior or exterior for the total distance shown in the table. Where horizontal sections of insulation require compressive strength for vehicle traffic and are not greater than eight inches horizontally, a structural thermal material with an *R*-value not less than R-1.8 shall suffice to maintain an installation without thermal breaks. Where installed, full slab insulation shall be continuous under the entire area of the slab-on-grade floor, except at structural column locations and service penetrations. Insulation required at the *heated slab* perimeter shall not be required to extend below the bottom of the heated slab and shall be continuous with the full slab insulation.

Exception: Where the slab-on-grade floor is greater than 24 inches (610 mm) below the finished exterior grade, perimeter insulation is not required.

22. **Section C402.6.1 Air barriers** is amended to read as follows:

C402.6.1 Air barriers. A continuous *air barrier* shall be provided throughout the *building thermal envelope*. The *air barrier* is permitted to be located at any combination of inside, outside or within the *building thermal envelope*. The *air barrier* shall comply with Sections C402.6.1.1 and C402.6.1.2. The *air barrier* boundaries and their surface area shall be clearly identified on the approved construction drawings. If the building within the *air barrier* boundary is divided

into *zones*, the following shall also be clearly identified on the approved construction drawings:

1. The *zone*(s);
2. The surface area of each *zone*; and
3. The *zones* to be tested for maximum building air infiltration and exfiltration.

Exception: *Air barriers* are not required in buildings located in *Climate Zone* 2B.

23. **Section C402.6.2 Air leakage compliance** is amended to read as follows:

C402.6.2 Air leakage compliance. *Air leakage* of the *building thermal envelope* shall be tested by an *approved* third party air leakage testing agency in accordance with Section C402.6.2.1. The measured *air leakage* shall not be greater than 0.25 cubic feet per minute per square foot (1.2 L/s x m^2) of the *building thermal envelope* area at a pressure differential of 0.3 inch water gauge (75 Pa) with the calculated *building thermal envelope* surface area being the sum of the *above*- and *below*-grade *building thermal envelope*.

Exceptions:

1. Where the measured *air leakage* rate is greater than 0.25 cfm/ft^2 (1.2 L/s × m^2), the *approved* third party shall perform a diagnostic evaluation using a smoke tracer, infrared imaging, or acoustic measurement. The evaluation shall be conducted while the building is pressurized or depressurized along with a visual inspection of the *air barrier* in accordance with ASTM E1186. All identified leaks shall be sealed and the building shall be re-tested and shall not exceed the measured *air leakage* rate specified in this section.

2. As an alternative, *buildings* or portions of *buildings* containing Group I-1 and R-2 occupancies shall be permitted to be tested by an *approved* third party air leakage testing agency in accordance with Section C402.6.2.2. The reported *air leakage* of the *dwelling units* or *sleeping units* shall not be greater than 0.27 cfm/ft^2 (1.4 L/s × m^2) of the *testing unit enclosure area* at a pressure differential of 0.2 inch water gauge (50 Pa).

24. **Section C402.6.2.1 Whole building test method and reporting** is amended to read as follows:

C402.6.2.1 Whole building test method and reporting. The *building thermal envelope* shall be tested by an *approved* third party in accordance with ASTM E3158 or an equivalent *approved* method. A report that includes the tested surface area, floor area, air by volume, stories above grade, and *air leakage rates* shall be submitted to the *code official* and the building

owner. The test method shall be a *building envelope* or operational envelope test and shall be a multi-point regression, in both pressurization and depressurization reaching building pressures of 75 Pa, with the results averaged over a single zone, two or more subsections tested as a single zone, or a *multi zone building*.

Exceptions:

. . .

25. **Section C402.6.2.2 Dwelling and sleeping unit enclosure method and reporting** is deleted in its entirety and replaced with the following:

C402.6.2.2 Dwelling and sleeping unit enclosure method and reporting. The *building thermal envelope* shall be tested in accordance with ASTM E779, ANSI/RESNET/ICC 380, ASTM E1827 and the *City of Fort Collins New Multifamily Air Tightness Testing Protocol*, dated December 16, 2025 (Ordinance No. 212, 2025). Documentation of the testing results shall be submitted to the *code official* prior to approval. If the *building* or *dwelling unit* fails *air leakage* testing, the testing agency is required to perform a diagnostic evaluation in accordance with ASTM E1186. The testing agency can use additional methods to discover leaks. Corrections based on these diagnostics must be made and the unit must be re-tested until it meets the required *air leakage* prior to submitting results to the *code official*. The measured *air leakage* shall not exceed 0.27 cfm/ft^2 (1.4 L/s m^2) of the testing unit enclosure area at a pressure differential of 0.2 inch water gauge (50 Pa). Units shall be tested separately with an unguarded blower door test as follows:

1. Where *buildings* have fewer than eight testing units, each testing unit shall be tested.
2. For *buildings* with eight or more testing units, 20 percent of the testing units in the *building* shall be tested, including at least one of each unit type and approximately an equal number of units on each floor level. For each tested unit that exceeds the maximum *air leakage* rate, corrections to the unit must be made and the unit must be re-tested until it meets the required *air leakage*, and an additional two units of this type in the same *building* shall be tested and meet the required *air leakage*.
3. A final inspection report shall be provided for inspections completed by the *registered design professional* or *approved* agency. The inspection report shall be provided to the *building owner* or *owner's* authorized agent and the *code official*. The report shall identify deficiencies found during inspection and details of corrective measures taken.

Exception: Corridors, stairwells, and enclosed spaces, other than a *dwelling unit* and *sleeping unit*, having a conditioned floor area not greater than 1,500 square feet (139 m^2) may alternatively comply with Section C402.6.2.3 and either Section C402.6.2.3.1 or Section C402.6.2.3.2.

26. **Section C402.6.2.3 Building thermal envelope design and construction verification criteria** is amended to read as follows:

C402.6.2.3 Building thermal envelope design and construction verification criteria. The installation of the continuous *air barrier* shall be verified by the *code official* and an *approved air leakage* testing agency in accordance with the following:

1. A review of the construction documents and other supporting data shall be conducted to assess compliance with the requirements in Section C402.6.1.
2. Inspection of continuous *air barrier* components and assemblies shall be conducted during construction while the *air barrier* is still accessible for inspection and repair to verify compliance with the requirements of Sections C402.6.2.3.1 and C402.6.2.3.2.
3. An *air barrier* and air sealing inspection report completed by the *approved air leakage* testing agency shall be provided to the *building owner* or *owner's* authorized agent and the *code official* at the time of framing and insulation inspection. The report shall identify deficiencies found during the review of the construction documents and inspection and details of corrective measures taken or to be undertaken.

27. **Section C402.6.4 Doors and access openings to shafts, chutes, stairways and elevator lobbies** is amended to read as follows:

C402.6.4 Doors and access openings to shafts, chutes, stairways and elevator lobbies. Doors and *access* openings from *conditioned space* to shafts, chutes, stairways and elevator lobbies not within the scope of the *fenestration* assemblies covered by Section C402.6.3 shall be gasketed, weather-stripped or sealed. Doors and *access* openings on vertical walls from *conditioned* space to unconditioned attic space shall be insulated to a minimum of R-7.

Exceptions:

1. Door openings required to comply with Section 716 of the *International Building Code.*
2. Doors and door openings required by the *International Building Code* to comply with UL 1784*.*

28. **Section C403.4.1.1 Heat pump supplementary heat** is amended to read as follows:

C403.4.1.1 Heat pump supplementary heat. Heat pumps having supplementary electric resistance heat shall have controls that limit supplemental heat operation to only those times when outdoor temperatures are less than or equal to 15°F (-9.4°C) and when one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the *thermostat* setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The *thermostat* malfunctions.

29. A new **Section C403.4.9 Demand response** is added to read as follows:

C403.4.9 Demand response.

C403.4.9.1 Demand responsive controls. Electric heating and cooling systems shall be provided with *demand responsive controls* capable of executing the following actions in response to a *demand response signal*:

1. Automatically increasing the zone operating cooling setpoint by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C) and 4°F (2°C).
2. Automatically decreasing the zone operating heating setpoint by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C) and 4°F (2°C).

Where a *demand response signal* is not available, the heating and cooling system controls shall be capable of performing all other functions. Where thermostats are controlled by direct digital control including, but not limited to, an energy management system, the system shall be capable of *demand responsive control* and capable of adjusting all thermal setpoints to comply. The *demand responsive controls* shall comply with either Section C403.4.9.1.1 or C403.4.9.1.2.

Exceptions:

1. Group I occupancies.
2. Group H occupancies.
3. Controls serving data center systems.
4. Occupancies or applications requiring precision in indoor temperature control where *approved* by the *code official*.
5. Buildings with energy storage capacity for not less than a 25 percent load reduction at peak load for a period of not less than 3 hours.

30. A new **Section C403.4.9.1.1 Air conditioners and heat pumps with two or more stages of control and cooling capacity of less than 65,000 Btu/h** is added to read as follows:

C403.4.9.1.1 Air conditioners and heat pumps with two or more stages of control and cooling capacity of less than 65,000 Btu/h. Thermostats for air conditioners and heat pumps with two or more stages of control and a cooling capacity less than 65,000 Btu/h (19 kW) shall be provided with a demand responsive control that complies with the communication and performance requirements of AHRI 1380.

31. A new **Section C403.4.9.1.2 All other heating and cooling systems** is added to read as follows:

C403.4.9.1.2 All other heating and cooling systems. Thermostats for heating and cooling systems not covered by Section C403.4.9.1.1 shall be provided with a demand responsive control that complies with one of the following:

1. Certified OpenADR 2.0a VEN, as specified under Clause 11, Conformance.
2. Certified OpenADR 2.0b VEN, as specified under Clause 11, Conformance.
3. Certified by the manufacturer as being capable of responding to a demand response signal from a certified OpenADR 2.0b VEN by automatically implementing the control functions requested by the VEN for the equipment it controls.
4. IEC 62746-10-1.
5. The communication protocol required by a controlling entity, such as a utility or service provider, to participate in an automated demand response program.
6. The physical configuration and communication protocol of ANSI/CTA 2045-A or ANSI/CTA 2045-B.

32. **Section C403.13.3.1 Protection of piping insulation** is amended to read as follows:

C403.13.3.1 Protection of piping insulation. Piping insulation exposed to the weather shall be protected from physical damage, including that caused by sunlight, moisture, equipment maintenance and wind. The protection shall provide shielding from solar radiation that can cause degradation of the material. The protection shall be removable and reusable for not less than 6 inches (152 mm) from the connection to the equipment piping for maintenance. Adhesive tape, paint products applied to HVAC system insulating materials, and other similar applications that require maintenance shall not be permitted as a means of insulation protection.

33. A new **Section C404.10 Demand responsive water heating** and **TABLE C404.10 DEMAND RESPONSIVE CONTROLS FOR WATER HEATING** are added to read as follows:

C404.10 Demand responsive water heating. Electric storage water heaters with a rated water storage volume of 40 gallons (151 L) to 120 gallons (454 L) and a nameplate input rating equal to or less than 12 kW shall be provided with *demand responsive controls* in accordance with Table C404.10 or another equivalent approved standard.

Exceptions:

1. Water heaters that provide a hot water delivery temperature of 180°F (82°C) or greater.
2. Water heaters that comply with Section IV, Part HLW or Section X of the ASME Boiler and Pressure Vessel Code.
3. Water heaters that use 3-phase electric power.

TABLE C404.10
DEMAND RESPONSIVE CONTROLS FOR WATER HEATING

Equipment Type	Standards Applicable to Controls	
	Manufactured Before 7/1/2025	**Manufactured On or After 7/1/2025**
Electric storage water heaters	AHRI Standard 1430 or ANSI/CTA-2045-B Level 1 and also capable of initiating water heating to meet the temperature set point in response to a *demand response signal*.	ANSI/CTA-2045-B Level 2, except "Price Stream Communication" functionality as defined in the standard.

34. **Section C405.2.7.1 Daylight shutoff** is amended to read as follows:

C405.2.7.1 Daylight shutoff. Lights shall be automatically turned off within 30 minutes after sunrise if daylight is present.

35. **Section C405.2.7.3 Lighting setback** is amended to read as follows:

C405.2.7.3 Lighting setback. Lighting that is not controlled in accordance with Section C405.2.7.2 shall comply with the following:

1. Be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent by selectively switching off or dimming luminaires at one of the following times:

   1.1. From not later than 1 hour after *building* or business closing to not earlier than 1 hour before *building* or business opening.

   1.2. During any time where activity has not been detected for 15 minutes or more.

2. Luminaires serving exterior parking areas shall be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent during any time where activity has not been detected

for 15 minutes or more. Not more than 1,500 watts of lighting power shall be controlled together.

36. **Section C405.2.9 Interior parking area lighting control** is amended to read as follows, with the exception to item #1 being deleted in its entirety:

C405.2.9 Interior parking area lighting control. Interior parking area lighting shall be controlled by an occupant sensor complying with Section C405.2.1.1 or a time-switch control complying with Section C405.2.2.1. Additional lighting controls shall be provided as follows:

1. Lighting power of each luminaire shall be automatically reduced by not less than 50 percent when there is no activity detected within a lighting zone for 15 minutes.

. . .

37. **Section C405.3.3 Lighting power for sleeping units and dwelling units** is amended to read as follows:

C405.3.3 Lighting power for sleeping units and dwelling units. *Sleeping units* in Group I-2 occupancies that are patient rooms shall comply with Sections C405.3.1 and C405.3.2. For all other *sleeping units* and *dwelling units*, permanently installed lighting, including lighting integrated into range hoods and exhaust fans, shall be provided by lamps capable of operating with an efficacy of not less than 65 lumens per watt or luminaires capable of operating with an efficacy of not less than 45 lumens per watt. *Sleeping units* shall have control devices or systems that are configured to automatically switch off all permanently installed luminaires, switched receptacles, televisions, and to adjust the heating, ventilating and air conditioning system set point by raising it at least 5°F (3°C) in the cooling mode and lowering it at least 5°F (3°C) in the heating mode whenever the *sleeping unit* is unoccupied. All permanently wired luminaires located in bathrooms within *sleeping units* shall be equipped with occupant sensors that require manual intervention to energize circuits.

Exceptions:

1. Lighting integral to other appliances.
2. Antimicrobial lighting used for the sole purpose of disinfecting.
3. Luminaires with an input rating of less than 3 watts.
4. Lighting and switched receptacles controlled by card key controls.
5. Existing *buildings* undergoing an occupancy change to R-1 and that have no more than 8 sleeping units.

38. **Section C405.13 Energy monitoring** is amended to read as follows:

C405.13 Energy monitoring. New *buildings* with greater than or equal to 600 amp electric service shall be equipped to measure, monitor, record and report energy consumption data in accordance with Sections C405.13.1 through C405.13.6 for load categories indicated in Table C405.13.2 and Sections C405.13.7 through C405.13.11 for end-use categories indicated in Table C405.13.8.

Exceptions:

1. *Dwelling units* in R-2 occupancies.
2. Individual tenant spaces are not required to comply with this section provided that the space has its own utility services and meters and has less than 5,000 square feet (464.5 m^2) of *conditioned floor area*.

39. **Section C405.15 Renewable energy systems** and all of **Sections C405.15.1** through **C405.15.4** are deleted in their entirety.

40. **Section C406.1.1 Additional energy efficiency credit requirements** is amended to read as follows:

C406.1.1 Additional energy efficiency credit requirements. *Buildings* shall comply with measures from Section C406.2 to achieve not less than the number of required efficiency credits from Table C406.1.1(1) based on building occupancy group and *climate zone.* Where a project contains multiple occupancies, the total required energy credits from each building occupancy shall be weighted by the gross *conditioned floor area* to determine the weighted-average project energy credits required. Accessory occupancies shall be included with the primary occupancy group for the purposes of Section C406. All *buildings* shall also comply with Section C406.1.1.3.

Exceptions:

. . .

41. A new **Section C406.1.1.3 Limit on energy credits from renewable energy** and **TABLE C406.1.1.3 LIMITS ON ENERGY CREDITS FROM RENEWABLE ENERGY** are added to read as follows:

C406.1.1.3 Limit on energy credits from renewable energy. For buildings utilizing renewable energy in accordance with energy credit ID R01 to achieve the required energy credits required in either Section C406.1.1.1 or Section C406.1.1.2, the number of energy credits achieved through renewable energy shall not exceed the limits in Table C406.1.1.3.

TABLE C406.1.1.3 LIMITS ON ENERGY CREDITS FROM RENEWABLE ENERGY

Building Occupancy Group	Maximum Renewable Energy Credits Allowed
R-2, R-4, and I-1	5
I-2	26
R-1	37
B	35
A-2	5
M	5
E	32
S-1 and S-2	35
All Other	6

42. **Section C406.1.2 Additional renewable and load management credit requirements** is deleted in its entirety.

43. **Section C406.2 Additional energy efficiency credits achieved** is deleted in its entirety and replaced with the following:

C406.2 Additional energy credits achieved. Energy credit measures shall achieve credits as follows:

1. Each energy credit measure from the energy efficiency category (energy credit ID E01-E06, H01-H05, W01-W10, P01, L01-L06, and Q01-Q04) used to meet credit requirements for the project shall have efficiency that is greater than the requirements in Sections C402 through C405.
2. Energy credit measures in the renewable energy and load management category in Sections C406.2.9 through C406.2.13 (energy credit ID G01-G05) require load management and control sequences shall be capable of and configured to automatically provide the load management operation specified based on indication of a peak period related to high short-term electric prices, grid condition, or peak building load. A peak period shall be initiated by a demand response signal from the controlling entity, such as a utility or service operator. Where communications are disabled or unavailable, all demand-responsive controls shall continue backup demand response based on a local schedule or building-demand monitoring. The local building schedule shall be adjustable without programming and reflect the electric rate peak period dates and times. The load management control sequences shall be activated for peak period control by one of the following:
    2.1 A certified OpenADR 2.0a or OpenADR 2.0b Virtual End Node (VEN), as specified under Clause 11, Conformance, in the applicable OpenADR 2.0 Specification.
    2.2 A device certified by the manufacturer as being capable of responding to a demand response signal from a certified OpenADR 2.0b VEN by automatically implementing the control functions requested by the VEN for the equipment it controls.

2.3 The physical configuration and communication protocol of ANSI/CTA-2045-A or ANSI/CTA-2045-B.

2.4 For air conditioners and heat pumps with two or more stages of control and cooling capacity of less than 65,000 Btu/h (19 kW), thermostats with a demand responsive control that complies with the communication and performance requirements of AHRI 1380.

2.5 A device that complies with IEC 62746-10-1.

2.6 An interface that complies with the communication protocol required by a controlling entity to participate in an automated demand response program.

2.7 Where the controlling entity does not have a demand response signal available for the building type and size, local load management control shall comply with one of the following:

2.7.1 Building demand management controls that monitor building electrical demand and initiate controls to minimize monthly or peak time period demand charges.

2.7.2 A local building schedule that reflects the electric rate peak period dates and times where buildings are less than 25,000 gross square feet (2322 m^2).

A binary input to the control system shall be provided that activates the demand response sequence.

3. Measures installed in the project that meet the requirements in Sections C406.2.1 through C406.2.16 shall achieve the base credits listed for the measure and occupancy type in Tables C406.2(1) through C406.2(9) or, when calculations are required by Sections C406.2.1 through C406.2.16 create or modify the credits from Tables C406.2(1) through C406.2(9), the credits achieved shall be based on the calculations. Energy credits achieved for measures shall be determined by one of the following, as applicable:

3.1 The measure's energy credit shall be the base energy credit from Tables C406.2(1) through C406.2(9) for the measure where no adjustment factor or calculation is included in the description of the measure in Section C406.2.

3.2 The measure's energy credit shall be the base energy credit for the measure adjusted by a factor or equation as stated in the description of the measure in Section C406.2. Where adjustments are applied, each measure's energy credit shall be rounded up to the nearest whole number.

3.3 The measure's energy credit shall be calculated in accordance with the measure's description in Section C406.2. Each individual measure credit shall be rounded up to the nearest whole number.

4. Energy credits achieved for the project shall be the sum of the individual measures' energy credits. Where a project contains multiple building occupancy groups:

   4.1 Credits achieved for each occupancy group shall be summed and then weighted by the conditioned floor area of each occupancy group to determine the weighted average project energy credits achieved.

   4.2 Improved envelope efficiency (energy credit ID E01 through E06), HVAC performance (energy credit ID H01), and lighting reduction (energy credit ID L06) measure credits shall be determined for the *building* or permitted *conditioned floor area* as a whole. Credits for other measures shall be determined for each occupancy separately. Credits shall be taken from applicable tables or calculations for each occupancy and weighted by the *building* occupancy group floor area.

44. **TABLE C406.2(1) BASE ENERGY CREDITS FOR GROUP R-2, R-4 AND I-1 OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(1) BASE ENERGY CREDITS FOR GROUP R-2, R-4 AND I-1 OCCUPANCIES[a]					
ID	**Energy Credit Measure**	**Section**	**Climate Zone**		
			. . .	**5B**	**. . .**
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

45. **TABLE C406.2(2) BASE ENERGY CREDITS FOR GROUP I-2 OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(2) BASE ENERGY CREDITS FOR GROUP I-2 OCCUPANCIES[a]					
ID	**Energy Credit Measure**	**Section**	**Climate Zone**		
			. . .	**5B**	**. . .**
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

46. **TABLE C406.2(3) BASE ENERGY CREDITS FOR GROUP R-1 OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(3) BASE ENERGY CREDITS FOR GROUP R-1 OCCUPANCIES[a]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

47. **TABLE C406.2(4) BASE ENERGY CREDITS FOR GROUP B OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(4) BASE ENERGY CREDITS FOR GROUP B OCCUPANCIES[a]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

48. **TABLE C406.2(5) BASE ENERGY CREDITS FOR GROUP A-2 OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(5) BASE ENERGY CREDITS FOR GROUP A-2 OCCUPANCIES[a]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

49. **TABLE C406.2(6) BASE ENERGY CREDITS FOR GROUP M OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(6) BASE ENERGY CREDITS FOR GROUP M OCCUPANCIES[a]			
ID		Section	Climate Zone

	Energy Credit Measure		. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

50. **TABLE C406.2(7) BASE ENERGY CREDITS FOR GROUP E OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(7) BASE ENERGY CREDITS FOR GROUP E OCCUPANCIES[a]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

51. **TABLE C406.2(8) BASE ENERGY CREDITS FOR GROUP S-1 AND S-2 OCCUPANCIES[a]** is amended by adding two rows to read as follows:

TABLE C406.2(8) BASE ENERGY CREDITS FOR GROUP S-1 AND S-2 OCCUPANCIES[a]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .
. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

52. **TABLE C406.2(9) BASE ENERGY CREDITS FOR OTHER OCCUPANCIES[a,b]** is amended by adding two rows to read as follows:

TABLE C406.2(9) BASE ENERGY CREDITS FOR OTHER OCCUPANCIES[a,b]					
ID	Energy Credit Measure	Section	Climate Zone		
			. . .	5B	. . .

. . .	. . .	. . .	. . .	. . .	. . .
R01	Renewable energy	C406.3.1	. . .	11	. . .
O01	Refrigerants	C406.2.16	. . .	2	. . .
. . .	. . .	. . .	. . .	. . .	. . .

53. A new **Section C406.3.1.1 Off-site renewable energy** is added to read as follows:

C406.3.1.1 Off-site renewable energy. Buildings that procure off-site renewable energy shall comply with Sections C406.3.1.1.1 through C406.3.1.1.3.

54. A new **Section C406.3.1.1.1 Off-site renewable energy requirements** and **TABLE C406.3.1.1.1(1) ANNUAL OFF-SITE RENEWABLE ENERGY REQUIREMENTS** are added to read as follows:

C406.3.1.1.1 Off-site renewable energy requirements. Off-site renewable energy shall be procured in accordance with Table C406.3.1.1.1(1).

TABLE C406.3.1.1.1(1) ANNUAL OFF-SITE RENEWABLE ENERGY REQUIREMENTS

Climate Zone	Annual Off-Site Renewable Electrical Energy (kWh/W)[a]
5B	1.75

a. Annual off-site renewable energy systems with 1.35 kWh/W to 1.75 kWh/W renewable electrical energy shall be reduced to 9 credits in TABLES C406.2(1), (2), (3), (4), (5), (6), (7), (8), (9). Systems with less than 1.35 kWh/W renewable electrical energy shall receive 0 credits.

55. A new **Section C406.3.1.1.2 Off-site procurement** is added to read as follows:

C406.3.1.1.2 Off-site procurement. The building owner, as defined in the adopted *International Building Code*, shall be credited for the total amount of off-site renewable electrical energy procured with one or more of the following:

1. *Physical renewable energy power purchase agreement*.
2. *Financial renewable energy power purchase agreement*.
3. *Community renewable energy facility*.
4. Off-site renewable energy system owned by the building owner.
5. *Renewable energy investment fund*.
6. *Green retail tariff*.

The generation source for off-site renewable electrical energy shall be located where the energy can be delivered to the *building site* by any of the following:

1. Direct connection to the off-site renewable energy facility.

2. The local utility or distribution entity.
3. An interconnected electrical network where energy delivery capacity between the generator and the *building site* is available.

56. A new **Section C406.3.1.1.3 Off-site contract** is added to read as follows:

C406.3.1.1.3 Off-site contract. The renewable energy shall be delivered or credited to the *building site* under an energy contract with a duration of not less than 15 years. The contract shall be structured to survive a partial or full transfer of ownership of the *building* property.

57. A new **Section C406.3.9 O01 Refrigerants** and **TABLE C406.3.9 ENERGY CREDIT ADJUSTMENT FOR REFRIGERANT GWP LEVEL** are added to read as follows:

C406.3.9 O01 Refrigerants. Projects that select equipment for space heating and *service water heating* that utilize low global warming potential (GWP) or ultra-low GWP refrigerants may receive energy credits for this measure calculated as follows:

Equation 4-34 $EC_{O01\_ach} = EC_{O01\_base} \times EC_{O01\_adj}$

where:

EC_{O01_ach} = Refrigerant credit achieved for the project.
EC_{O01_base} = O01 base energy credit from Tables C406.2(1) through C406.2(9).
EC_{O01_adj} = Energy credit adjustment factor from Table C406.2.16.

TABLE C406.3.9 ENERGY CREDIT ADJUSTMENT FOR REFRIGERANT GWP LEVEL

Refrigerant Category	GWP Limit (kgCO2e)	EC_{O01_adj}
Ultra-low GWP	< 10	100%
Low GWP	10 to 50	50%
Other	> 150	0%

58. **Section C407.2 Mandatory requirements** is amended to read as follows:

C407.2 Mandatory requirements. Compliance based on *simulated building performance* requires that a *proposed design* meet all the following:

1. The requirements of the sections indicated within Table C407.2(1)
2. The requirements of CZ103.1.

59. **TABLE C407.2(1) REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE** is amended to read as follows:

TABLE C407.2(1) REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE	
SECTION[a]	**TITLE**
Envelope	
. . .	. . .
C402.2.4	Slabs-on-grade
. . .	. . .
Other	
C410	Electric Ready, and Solar Ready
. . .	. . .

59. **TABLE C407.4.1(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS** is amended to read as follows:

TABLE C407.4.1(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS		
BUILDING COMPONENT CHARACTERISTICS	**STANDARD REFERENCE DESIGN**	**PROPOSED DESIGN**
. . .	. . .	. . .
On-site renewable energy	*On-site renewable energy* shall not be included in the standard reference design.	As proposed
. . .	. . .	. . .

60. **Section C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements** is amended to read as follows:

C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements.

. . .

Exceptions: The following systems are exempt:

1. *Buildings* with less than 10,000 square feet (929 m^2) gross *conditioned floor area*.
2. Systems included in Section C403.5 that serve individual *dwelling units* and *sleeping units*.

61. **Section C408.2.5.2 Final commissioning report** is amended to read as follows:

C408.2.5.2 Final commissioning report. A report of test procedures and results identified as “Final Commissioning Report” shall be delivered to the *building owner* or owner’s authorized agent and shall be made available to

the *code official* upon request. The report shall be organized with mechanical system and service hot water system findings in separate sections to allow independent review. The report shall include the following:

1. Results of functional performance tests.
2. Disposition of deficiencies found during testing, including details of corrective measures used.
3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception: Deferred tests that cannot be performed at the time of report preparation due to climatic conditions.

62. A new **SECTION C410 ELECTRIC READY AND SOLAR READY** is added to read as follows:

SECTION C410 ELECTRIC READY AND SOLAR READY

C410.1 Scope. This section establishes requirements for electric readiness, solar readiness, and *electric vehicle (EV)* readiness in *commercial buildings*.

C410.2 Compliance. *Commercial buildings* shall comply with Sections C410.3 through C410.5.

C410.3 Electric ready.

C410.3.1 General. The provisions of Section C410.3 shall apply to all new *buildings*, *additions*, and *first tenant finish* permits.

C410.3.1.1 First tenant finishes. In the case that a *first tenant finish* to a commercial *core and shell* building or unfinished space is used to satisfy any requirements of Section C410.3, the *code official* shall not issue a Certificate of Occupancy to the tenant until the requirements of Section C410.3.2 are met.

C410.3.2 Additional electric infrastructure. *Combustion equipment* in *commercial buildings* shall meet the electric infrastructure requirements of Sections C410.3.2.1 or C410.3.2.2.

Exceptions:

1. Interior fireplaces that do not serve as a primary source of heating.
2. Exterior fireplaces and fire pits.
3. Additions to buildings that do not provide new space heating equipment shall not be required to provide additional electrical infrastructure to the existing space heating equipment.

C410.3.2.1 Commercial building less than 10,000 square feet and all R-occupancies. *Commercial buildings* that have a gross floor area of less than 10,000 square feet (929 m^2), and all Group R-2, R-3, and R-4 occupancies four stories or greater in height above *grade plane*, shall comply with Sections C410.3.2.1.1 through C410.3.2.1.5.

C410.3.2.1.1 Combustion equipment. *Combustion equipment* shall be provided with all of the following:

1. A dedicated, appropriately phased branch circuit sized to accommodate *future electric equipment* or appliances.

    1.1 Electrical infrastructure serving future electric space heating shall comply with Section C410.3.2.1.1.1.

    1.2 Electrical infrastructure serving future electrical water heating equipment shall comply with Section C410.3.2.1.1.2.

    1.3 Electrical infrastructure serving future electric cooking equipment or clothes drying equipment shall be sized to serve a comparable capacity to meet the equipment load in accordance with the *National Electrical Code*.

2. An electric receptacle or junction box that meets the requirements of Section C410.3.2.1.4 and is connected to the electrical panel through the branch circuit. Each electrical receptacle or junction box shall have reasonable access to the *combustion equipment* or dedicated physical space for *future electric equipment* with no obstructions other than the current *combustion equipment*.

    Exception: Conduit installed with a pull string to a location of a future transformer or future electrical panel with service size determined at the time of a future permit.

3. Where *combustion equipment* is used for space or water heating, dedicated physical space shall be provided for all *future electric equipment*, including an electric resistance backup coil for ducted systems. Physical space occupied by existing *combustion equipment* shall be permitted to count towards satisfying the physical space requirement, where *approved* by the *code official*.

    Exception: Buildings with installed air conditioning systems shall not be required to provide additional dedicated physical space for an outdoor heat pump.

C410.3.2.1.1.1 Space heating electric infrastructure sizing. Electric infrastructure for future electric space heating equipment shall be sized to accommodate at least one of the following:

1. An electrical capacity not less than the nameplate space heating combustion equipment heating capacity multiplied by the value in Table C410.3.2.1.1.1, in accordance with Equation 4-39.

   Equation 4-39 $VA_S = Q_{com} \times P_S$

   where:

   VA_S = The required electrical capacity of the electrical infrastructure in volt-amps.

   Q_{com} = The nameplate heating capacity of the combustion equipment in kBtu/h.

   P_S = The VA per kBtu/h from Table C410.3.2.1.1.1 in VA/kBtu/h.

2. An electrical capacity not less than the peak space heating load of the building areas served by the space heating *combustion equipment*, calculated in accordance with Section C403.1.1, multiplied by the value for the 99.6 percent design heating temperature in Table C410.3.2.1.1.1, in accordance with Equation 4-40.

   Equation 4-40 $VA_S = Q_{design} \times P_S$

   where:

   VA_S = The required electrical capacity of the electrical infrastructure in volt-amps.

   Q_{design} = The 99.6 percent design heating load of the spaces served by the *combustion equipment* in kBtu/h.

   P_S = The VA per kBtu/h from Table C410.3.2.1.1.1 in VA/kBtu/h.

3. An *approved* alternate design that uses no energy source other than electricity or *on-site renewable energy*.

TABLE C410.3.2.1.1.1 ALTERNATE ELECTRIC SPACE HEATING EQUIPMENT CONVERSION FACTORS (VA/kBtu/h)	
99.6% Heating Design Temperature	**P_s**
Temperature Range (°F)	**VA / kBtu/h**
>50	N/A
>45 and ≤50	94
>40 and ≤45	100
>35 and ≤40	107
>30 and ≤35	115
>25 and ≤30	124
>20 and ≤25	135
>15 and ≤20	149
>10 and ≤15	164
>5 and ≤10	184
>0 and ≤5	210
>-5 and ≤0	243
>-10 and ≤-5	289
>-15 and ≤-10	293

C410.3.2.1.1.2 Water heating electric infrastructure sizing. An individual 240-volt branch circuit with an ampacity of not less than 30 shall be provided for future electric water heating equipment with a capacity of not more than 75,000 Btu/h (22 kW). Electric infrastructure for future electric water heating equipment with a capacity of greater than 75,000 Btu/h (22 kW) shall be sized to accommodate one of the following:

1. An electrical capacity not less than the combustion equipment water heating capacity multiplied by the value in Table C410.3.2.1.1.2 plus electric capacity to serve recirculating loads as shown in Equation 4-41.

   Equation 4-41 $VA_w = (Q_{capacity} \times P_w) + [Q_{recirc} \times 293(VA/(Btu/h))]$

   where:

   VA_w = The required electrical capacity of the electrical infrastructure in volt-amps.

   $Q_{capacity}$ = The nameplate heating capacity of the combustion equipment in kBtu/h.

   P_w = The VA per kBtu/h from Table C410.3.2.1.1.2 in VA/kBtu/h.

2. An alternate design that complies with this code, where *approved* by the *code official*, and uses no energy source other than electricity or *on-site renewable energy*.

TABLE C410.3.2.1.1.2 ALTERNATE ELECTRIC WATER HEATING EQUIPMENT CONVERSION FACTORS (VA / kBtu/h)

99.6% Heating Design Temperature	P_s
Temperature Range (°F)	VA / kBtu/h
>55 and ≤60	118
>50 and ≤55	123
>45 and ≤50	129
>40 and ≤45	136
>35 and ≤40	144
>30 and ≤35	152
>25 and ≤30	162
>20 and ≤25	173
>15 and ≤20	185
>10 and ≤15	293
>5 and ≤10	293
>0 and ≤5	293
≤0	293

C410.3.2.1.2 Electric panel space. The electrical panel shall have reserved physical space for a minimum two-pole or three-pole circuit breaker for each branch circuit provided for *future electric equipment* or appliances. The physical space in the electrical panel for each circuit breaker shall be sized with sufficient breaker capacity to meet the electrical demand of the *future electric equipment* or appliance that is sized to serve a comparable capacity to meet the heating load.

C410.3.2.1.3 Labeling. The junction box or receptacle and the dedicated circuit breaker space serving *future electric equipment* or appliances in the electrical panel shall be labeled for their intended use.

C410.3.2.1.4 Adjacency. The electrical receptacle or junction box shall be provided within 3 feet of the *combustion equipment* or appliances or within 3 feet of the dedicated physical space for *future electric equipment* or appliances.

Exception: For *combustion equipment* dedicated to space or water heating, the electrical receptacle or junction box shall be located not more than 6 feet from the *combustion equipment* or the dedicated physical space for *future electric equipment*.

C410.3.2.1.5 Condensate drain. Where *combustion equipment* dedicated to space heating and water heating is installed, a location shall be provided for condensate drainage.

C410.3.2.2 Commercial buildings 10,000 square feet or greater. All *commercial buildings* that have a gross floor area of 10,000 square feet (929 m^2) or greater shall comply with Sections C410.3.2.2.1 through C410.3.2.2.5.

Exception: Group R-2, R-3, R-4 occupancies four stories or greater in height above *grade plane* shall comply with Section C410.3.2.1.

C410.3.2.2.1 Combustion equipment. *Combustion equipment* shall be provided with all of the following:

1. A junction box that is located in the same physical space as the *combustion equipment*, reasonably accessible, and connected to the electrical panel by continuous conduit and/or raceways.

2. Dedicated electrical panel space for an appropriately phased branch circuit sized to accommodate *future electric equipment* or appliances.

    2.1. Electrical capacity sizing for future electric space heating equipment shall comply with Section C410.3.2.1.1.1.
    2.2. Electrical capacity sizing for future electric water heating equipment shall comply with Section C410.3.2.1.1.2.
    2.3. Electrical infrastructure serving future electric cooking equipment or clothes drying equipment shall be sized to serve a comparable capacity to meet the equipment load in accordance with the *National Electrical Code*.

3. Where *combustion equipment* is used for space and water heating, dedicated physical space shall be provided for all *future electric equipment*. Physical space occupied by existing *combustion equipment* shall be permitted to count towards satisfying the physical space requirement, where *approved* by the *code official*.

C410.3.2.2.2 Electrical panel space. The electrical panel shall have reserved physical space for a minimum two-pole or three-pole circuit breaker for each branch circuit provided for *future electric equipment* or appliances. The physical space in the electrical panel for each circuit breaker shall be sized with sufficient breaker capacity to meet the electrical demand of the *future electric equipment* or appliance that is sized to serve a comparable capacity to meet the heating load.

C410.3.2.2.3 Labeling. The dedicated circuit breaker space serving *future electric equipment* or appliances in the electrical panel shall be labeled “For future electric equipment.”

C410.3.2.2.4 Physical space. Dedicated physical space shall be provided for additional electric equipment, including but not limited to transformers and cabinets, necessary for electrical service to *future electric equipment* or appliances**.**

C410.4 Solar ready.

C410.4.1 General. The provisions of Section C410.4 shall apply to new *buildings*, and major renovations and *additions*.

C410.4.2 Solar-ready zone. A *solar-ready zone* shall be located on the roof of all new *commercial buildings* that are oriented between 110 and 270 degrees of true north or have low-sloped roofs. *Solar-ready zones* shall comply with Sections C410.4.2.1 through C410.4.2.6.

Exceptions:

1. A *building* with a permanently-installed, on-site renewable energy system that meets the following criteria:
   1.1 The system produces the energy output equivalent to covering 40 percent of the net roof area with solar photovoltaic calculated as the horizontally projected gross roof area less that area covered by skylights, occupied roof decks, vegetative roof areas, and mandatory access or setback areas required by the *International Fire Code*.
   1.2 The system is located on the roof or overhang of the *building* or another structure located within 250 feet of the *building*, on the *building* premises, on covered parking, or another *approved* location installed with the *building* project and under the same property ownership.
2. A *building* with a *solar-ready zone* that is shaded for more than 70 percent of daylight hours annually.
3. A *building* where a licensed design professional certifies that the incident solar radiation available to the *building* is not suitable for a *solar-ready zone*.
4. A *building* where a licensed design professional certifies that the *solar-ready zone* area required by Section C410.4.4 cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas, or other obstructions.

C410.4.2.1 Construction document requirements for a solar-ready zone. Construction documents shall indicate the *solar-ready zone*.

C410.4.2.1.1 Roof loads and documentation. The structural design loads for roof dead load and roof live load shall be indicated on the construction documents.

C410.4.2.1.2 Interconnection pathway. Construction documents shall indicate at least one potential pathway for routing of conduit and/or raceway from the *solar-ready zone* to an electrical service panel, which shall be labeled as “Potential Pathway” on the construction documents.

C410.4.2.2 Solar-ready zone area. The total *solar-ready zone* area shall be at least 40 percent of the roof area calculated as the horizontally projected gross roof area less the area covered by skylights, occupied roof decks, vegetative roof areas, and mandatory access or set back areas required by the *International Fire Code*. The *solar-ready zone* shall be a single area or smaller, separated sub-zone areas. For sloped roofs, each sub-zone area shall be at least 200 square feet (18.6 m^2), and the sides of each rectangular area shall be at least 11 feet (3.35 m) in length. For low-sloped or flat roofs, each sub-zone area shall be at least 330 square feet (30.7 m^2), with a minimum length running generally north to south of 15 feet (4.57 m) and a minimum length running generally east to west of 22 feet (6.7 m), and the sides of each rectangular area shall be at least 11 feet (3.35 m) in length.

The *solar-ready zone* shall be located on the roof or overhang of the *building* or another structure located within 250 feet of the *building*, on the *building* premises, on covered parking, or another *approved* location installed with the *building* project and under the same property ownership.

C410.4.2.3 Obstructions. *Solar-ready zones* shall be free from obstructions, including pipes, vents, ducts, HVAC equipment, skylights, and roof-mounted equipment.

C410.4.2.6 Electrical service reserved space. The main electrical service panel shall have a minimum bus bar rating of at least 200 amps. The main electrical service panel shall have a reserved space to allow installation of a dual-pole circuit breaker for future solar electric. This space shall be labeled “For Future Solar Electric.” The reserved space shall be positioned at the end of the panel that is opposite from the panel supply conductor connection.

C410.4.3 Commercial solar panel capacity.

C410.4.3.1 General. The provisions of Section C410.4.3 shall apply to new *buildings*, and major renovations and *additions*.

C410.4.3.2 Electric service reserved space. The main electrical service panel shall have a minimum bus bar rating of at least 200 amps. The main electrical service panel shall have sufficient reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and the reserved space shall be labeled "For Future Solar Electric." The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

Exception: A *commercial building* that must comply with the solar ready provisions of Section C410.4.2 or that has a permanently-installed on-site renewable energy system that provides electricity to the *building's* electrical system.

63. A new **SECTION C411 INTEGRATED DESIGN ASSISTANCE** is added to read as follows:

SECTION C411 INTEGRATED DESIGN ASSISTANCE

C411.1 Scope. This section establishes criteria for compliance using Appendix G of ASHRAE 90.1, entitled Performance Rating Method, in accordance with the City of Fort Collins Integrated Design Assistance Program referred to herein as "IDAP".

C411.2 Requirements for Integrated Design Assistance. Participation in this compliance path requires:

1. The project must be an active participant in IDAP.
2. The project must have qualified for the Design Incentive.

C411.3 Documentation. The documentation required for compliance is the energy report based on the submitted CD drawing package and approved by the IDAP program manager.

C411.3.1 Compliance report. Permit submittals shall include the energy report documenting that the proposed design has annual energy costs less than or equal to the annual energy costs of the baseline building adjusted to current code and in accordance with IDAP. The report shall include the following information:

1. Address of the *building*.
2. An inspection checklist documenting the building component characteristics of the *proposed design.* The inspection checklist shall show the estimated annual energy cost for both the baseline building adjusted to current code and the *proposed design*.
3. Name of individual completing the compliance report.

4. Name and version of the compliance software tool.

C411.3.2 Additional documentation. The *code official* may also require production of documentation of the building component characteristics of the Baseline Building including the code Building Performance Factor and proposed Building Performance Factor.

64. **Section C501.2 Compliance** is amended to read as follows:

C501.2 Compliance. *Additions*, *alterations*, *repairs*, and changes of occupancy to, or relocation of, existing *buildings* and structures shall comply with Sections C502, C503, C504 and C505 of this code, as applicable, and with the provisions for *alterations*, *repairs*, *additions* and changes of occupancy or relocation, respectively, in the *International Building Code*, *International Existing Building Code, International Fire Code, International Fuel Gas Code, International Mechanical Code, International Plumbing Code*, *International Property Maintenance Code* and NFPA 70, as adopted by the City. Changes where unconditioned space is changed to conditioned space shall comply with Section C502.

Exceptions:

1. *Additions*, *alterations*, *repairs* or changes of occupancy complying with ANSI/ASHRAE/IES 90.1.
2. *Additions*, *alterations*, *repairs* or changes of occupancy do not need to comply with the requirements of C402.2.4 Slabs-on-grade floors when it would require the demolition of existing permanent building construction components.

65. **Section C502.3.7 Additional energy efficiency credit requirements** is amended to read:

C502.3.7 Additional energy efficiency credit requirements. *Additions* shall comply with sufficient measures from Sections C406.2 and C406.3 to achieve not less than 50 percent of the number of required efficiency credits from Table C406.1.1(1) based on building occupancy group and *climate zone*. Where a project contains multiple occupancies, credits from Table C406.1.1(1) for each building occupancy shall be weighted by the gross floor area to determine the project weighted average energy credits required. Accessory occupancies shall be included with the primary occupancy group for purposes of this section. *Alterations* to the existing building that are not part of the *addition*, but are permitted with an *addition*, shall be permitted to be used to achieve the required credits. All a*dditions* shall also comply with Section C406.1.1.3.

Exceptions:

. . .

66. **Section C502.3.8 Renewable energy systems** is deleted in its entirety.

67. A new **APPENDIX CZ COMMERCIAL PERFORMANCE PATH TO ZERO CARBON BUILDING** is added to read as follows:

APPENDIX CZ
COMMERCIAL PERFORMANCE PATH TO ZERO CARBON BUILDING

SECTION CZ101
GENERAL

CZ101.1 Purpose. This appendix provides requirements that lead to achievement of zero emissions buildings and identifies future targets that achieve zero emissions buildings by the 2030 code cycle.

CZ101.2 Scope. New *buildings* shall comply with the requirements in this appendix.

SECTION CZ102
GENERAL DEFINITIONS

CARBON DIOXIDE EQUIVALENT (CO2e). A measure used to compare the impact of various greenhouse gases based on their global warming potential (GWP). CO2e approximates the time-integrated warming effect of a unit mass of a given greenhouse gas relative to that of carbon dioxide (CO2). GWP is an index for estimating the relative global warming contribution of atmospheric emissions of a particular greenhouse gas compared to emissions of an equal mass of CO2.

COMMUNITY RENEWABLE ENERGY FACILITY. A facility that generates electricity with photovoltaic, solar thermal, geothermal energy, or wind energy systems, and is qualified as a community energy facility under applicable state and local utility statutes and rules.

DIRECT OWNERSHIP. An off-site renewable energy system under the ownership or control of the building project *owner*.

GREEN RETAIL PRICING. A program by the retail electricity provider to provide 100 percent renewable energy to the building project *owner*.

GROSS SITE EUI. The energy use intensity (EUI) as measured by the total amount of energy consumed on the site, in total, with no contributions or deductions from onsite energy generation or offsite energy generation procurements. Gross Site EUI shall be measured by total energy consumed and not take into consideration any *net* value of energy consumption or deductions made from the *gross* energy consumption by renewable onsite energy generation or offsite energy procurement.

NET ONSITE ELECTRICITY CONSUMPTION. The electricity consumption of the site as measured when contributions from eligible onsite or off-site renewable energy

systems are taken into consideration and subtracted from the *gross* onsite electricity consumption. The net onsite electricity consumption shall be measured as the total amount of eligible renewable energy attributable to the building site subtracted from the gross total amount of onsite electricity consumed by the building site.

RENEWABLE ENERGY INVESTMENT FUND (REIF). A fund established by a jurisdiction to accept payment from building project owners to construct or acquire interest in qualifying renewable energy systems, together with their associated RECs, on the building project owner's behalf.

RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPA), FINANCIAL. A financial arrangement between a renewable electricity generator and a purchaser wherein the purchaser pays or guarantees a price to the generator for the project's renewable generation. Also known as a "financial power purchase agreement" and "virtual power purchase agreement."

RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPA), PHYSICAL. A contract for the purchase of renewable electricity from a specific renewable electricity generator to a purchaser of renewable electricity.

SECTION CZ103
COMPLIANCE

CZ103.1 Compliance. Compliance with this appendix shall be demonstrated using the *Simulated Building Performance* option of Section C401.2.1 and by following Sections CZ103.2 through CZ103.5.

CZ103.2 Building energy compliance. The proposed building model performance (*Gross Site EUI*) shall not exceed the applicable code year values in Table CZ103.2(1) using the energy modeling procedures described in Section C407.4 and Section CZ103.3; however, the proposed building shall be modeled with no on-site renewable energy generation. Buildings with multiple occupancy types listed in Table CZ103.2(1) may develop a performance target based on an area weighted average EUI calculated by floor area of each occupancy type.

TABLE CZ103.2(1) *GROSS SITE EUI* TARGETS BY CODE YEAR[a]

Building Type	2024 Performance Target (kBtu/ft^2/year)	2027 Performance Target[b] (kBtu/ft^2/year)	2030 Performance Target[b] (kBtu/ft^2/year)
Apartment (Type R2)	29	26	24
Primary School	39	24	19
Small Office (<5,000 sf)	20	19	17
Medium Office (5,000-50,000 sf)	23	21	20
Large office (>50,000 sf)	38	31	23
Secondary School	26	22	19
Warehouse	11	10	9

Retail Store	36	35	34
Small Hotel (<75,000 sf)	41	33	25
Large Hotel (>75,000 sf)	61	54	48
Hospital	74	69	65
Restaurant	228	177	126
Strip Mall	35	30	25

a. Building types not found within this table shall comply with C407 Simulated Building Performance and CZ103.2.2 Building Emission Compliance.
b. These are projected EUI targets for buildings constructed under the 2027 and 2030 code cycles and are not required for the 2024 code.

CZ103.2.1 Building emission compliance. The annual energy emissions (AEE_p) of the *proposed design* shall be less than or equal to the annual *energy* emissions (AEE_b) of the *standard reference design* as modified in Equation CZ-1. Electricity energy emissions for the *standard reference design* [Equation CZ-2] and *proposed design* [Equation CZ-3] shall be calculated using the long-run marginal emission rates from Table CZ103.4 for each time period. The calculation shall be made using month-hour (288 values) or annual-hour values (24 values). For fossil fuels and thermal energy, the *CO2e* emissions shall be calculated by multiplying the *CO2e* emission factors taken from Table CZ103.3.2 by the annual consumption. Compliance using Equation CZ-1 shall be demonstrated using the emissions factor *CO2F* found in Table CZ103.2.1.

TABLE CZ103.2.1 EMISSION FACTORS

Emission Factor (*CO2F*)		
2024	**2027**[a]	**2030**[a]
0.95	0.50	0.0

a. These are projected CO2F targets for buildings constructed under the 2027 and 2030 code cycles and are not required for the 2024 code.

Equation CZ-1 $AEE_p \leq AEE_b * CO2F$

where:

AEE_x = Annual Energy Emissions of the *proposed design* (AEE_p) or *standard reference design* (AEE_b).

CO2F = Emission Factor, found in Table CZ103.2.1

Equation CZ-2 $AEE_b = \Sigma[qB_{e,t} \times e_{e,t}] + \Sigma [Q_i \times e_i]$

Equation CZ-3 $AEE_p = \Sigma[qP_{e,t} \times e_{e,t}] + \Sigma [Q_i \times e_i] - AE$

where:

$qB_{e,t}$ = *Standard reference design* electricity consumption for time period *t*, MWh

$qP_{e,t}$ = *Proposed design net onsite electricity consumption* for time period *t*, MWh

$e_{e,t}$ = Long-run marginal *CO2e* emissions rate for electricity in time period *t*, found in Table CZ103.4

Q_i = Annual energy consumption for fossil fuels or thermal energy, MWh

e_i = *CO2e* emissions rate found in Table CZ103.3.2 for fossil fuel or thermal energy type *i*

AE = Avoided CO2e emissions resulting from the purchase of off-site renewable energy, calculated using Equation CZ-4

CZ103.2.2 Avoided emissions. The avoided emissions from off-site renewable energy procurement shall be calculated as shown in the following equation and meet the requirements of Section CZ103.4.

Equation CZ-4 $AE = \Sigma[Q_g \times REF \times AE_g] * PF$

where:

Q_g = annual renewable electricity procured for renewable energy generator type *g*, MWh

g = index for generator type

AE_g = annual avoided *CO2e* emissions rate for renewable energy generator type *g* from Table CZ103.5(2), kg/MWh

REF = Offsite Renewable Energy Factor which shall equal 0.75

PF = Procurement energy Factor from Table CZ103.5(1)

CZ103.3 Calculation procedure. Except as specified by this section, the *standard reference design* and *proposed design* area shall be configured and analyzed using identical methods and techniques.

CZ103.3.1 Building specifications. The *standard reference design* and *proposed design* shall be configured and analyzed as specified by Table C407.4.1(1) with the following modifications:

1. The Heating systems fuel type for the *standard reference design* shall be electric.
2. The Cooling systems fuel type for the *standard reference design* shall be electric.
3. The *Service water heating* fuel type for the *standard reference design* shall be electric.

For the purpose of compliance with this section, the *standard reference design* and *proposed design* shall comply with all footnotes contained in Table C402.1.2.

CZ103.3.2 Emission rates for fossil fuels and thermal energy. The emissions factors for fossil fuels or thermal energy to be used in the calculations in Section CZ103.2.1 shall be as specified in Table CZ103.3.2.

TABLE CZ103.3.2 CO2E EMISSION FACTORS FOR FOSSIL FUELS AND THERMAL ENERGY

Fossil Fuels Delivered to Buildings	CO2e Emissions, kg/MWh
Natural Gas	277
Liquified Petroleum Gas or Propane	295
Fuel Oil (Residual)	334
Fuel Oil (Distillate)	324
Coal	382
Gasoline	337
Other Fuels not Specified in this Table	382

CZ103.4 Long range marginal emission rates. The long-run marginal emission rates (LRMERs) for the Cambium Generation and Emission Assessment Region $RMPA_c$, to be used for calculations in Section CZ103.2 ($e_{e,t}$ in Equations CZ-2 and CZ-3), shall be as specified in Table CZ103.4. The LRMERs are based on a 20-year CO2e time horizon. The Cambium Generation and Emission Assessment Regions are shown in Figure CZ-103.4. Where comparing or combining *CO2e* values, a consistent GWP time-horizon shall be used for all estimates of *CO2e*.

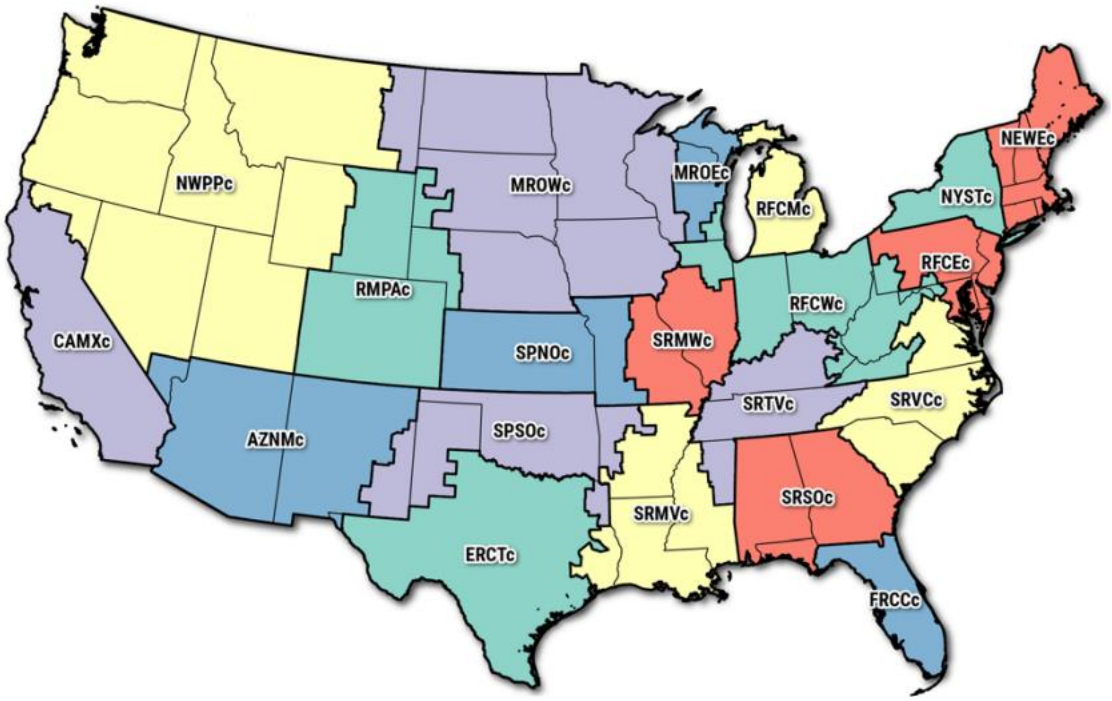

FIGURE CZ-103.4 CAMBIUM GENERATION AND EMISSION ASSESSMENT REGIONS (2021 VERSION)

TABLE CZ103.4 RMPAc - HOURLY AND AVOIDED EMISSIONS (kg/MWh)													
Hour	January	February	March	April	May	June	July	August	September	October	November	December	Annual
-	223	237	171	158	175	188	209	237	243	227	265	258	217
1	227	232	173	162	174	206	223	240	256	238	269	253	222
2	225	231	168	154	179	198	234	247	244	229	276	259	222
3	229	233	174	155	180	199	234	258	253	222	269	261	224
4	227	225	183	155	175	176	222	244	250	234	259	245	217
5	215	206	175	145	159	157	171	214	231	223	254	240	200
6	224	205	152	140	137	144	145	189	214	203	243	240	187
7	213	182	154	129	146	148	139	170	184	185	226	223	176
8	181	162	150	135	150	144	142	160	183	184	207	200	167
9	172	164	143	138	141	139	132	155	174	188	213	189	162
10	166	174	134	133	146	138	131	154	170	181	220	195	161
11	174	190	140	136	139	138	127	152	166	182	208	190	161
12	178	180	137	140	136	139	124	160	165	190	210	188	161
13	182	171	136	141	141	141	125	160	157	193	208	201	162

14	174	172	135	135	133	133	125	152	155	179	216	217	159
15	198	192	141	147	137	138	127	157	170	193	244	232	172
16	214	212	173	154	152	139	148	184	195	211	233	245	187
17	215	204	193	169	172	150	174	209	215	204	235	238	198
18	209	206	192	175	175	172	181	214	216	204	235	242	202
19	219	204	181	169	173	187	197	218	203	212	230	256	205
20	223	210	180	167	169	184	182	206	210	218	233	244	202
21	223	210	174	161	173	200	193	217	225	229	242	249	208
22	233	216	172	161	183	199	194	230	228	211	255	251	212
23	224	225	166	158	174	182	201	225	232	215	263	263	211

CZ103.5 Off-site renewable energy. Buildings that do not have on-site renewable energy systems sufficiently sized to fully comply with Section CZ103.2.2 shall procure off-site renewable energy in accordance with Sections CZ103.5.1 through CZ103.5.3.

TABLE CZ103.5(1) PROCUREMENT FACTOR FOR USE WITH OFF-SITE RENEWABLE ENERGY

Building Type	Procurement Factor
Apartment (Type R2)	1
Primary School	1
Small Office (<5,000 sf)	1
Medium Office (5,000-50,000 sf)	1
Large Office (>50,000 sf)	1
Secondary School	1
Warehouse	1
Retail Store	1
Small Hotel (<75,000 sf)	1
Large Hotel (>75,000 sf)	1
Hospital	3.5
Restaurant	10
Strip Mall	1
All Other[a]	10

a. Includes the following building types: Laundromat, Food Processing Establishments, Emergency Systems, Crematory, or other buildings with high process loads as determined by the *code official* on a case-by-case basis.

TABLE CZ103.5(2) AVOIDED EMISSIONS FROM OFF-SITE PURCHASE OF RENEWABLE ENERGY (kg/MWh)

GEA Region	Solar	Wind	Hydro	Geothermal
RMPAc	159	195	187	191

CZ103.5.1 Off-site procurement. The *building owner* shall be credited for the total amount of off-site renewable energy required by Equation CZ-1. Procured off-site energy shall comply with the requirements applicable to at least one of the following:

1. *Community renewable energy facility*.
2. *Financial renewable energy power purchase agreement*.
3. *Direct Ownership*.
4. *Renewable Energy Investment Fund.*
5. *Green Retail Pricing*.
6. The energy source shall produce electricity from solar, wind, or geothermal energy.

Exceptions:

1. Hydropower from new generation capacity on a non-impoundment or new generation capacity on an existing impoundment that meets one of the following conditions:
   1.1. The hydropower facility complies with the Low Impact Hydropower Certification Handbook and is certified by a nationally recognized accreditation organization.
   1.2. The hydropower facility complies with UL 2854 and is certified by an organization that has the standard in its ISO/IEC 17065 scope of accreditation.
   1.3. The hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

For facilities falling under Exception 1.1 or 1.2, only output generated during the period of certification is eligible for RECs sale in accordance with the provisions of this section. Renewables from new impoundments of water are not eligible.

CZ103.5.1.1 Location of energy generation. The generation source shall be located where the energy can be delivered to the *building site* by any of the following:

1. Direct connection to the off-site renewable energy facility.
2. The local utility or distribution entity.
3. An interconnected electrical network where energy delivery capacity between the generator and the building site is available (Informative Note: Examples of interconnected electrical networks include regional

power pools and regions served by independent system operators or regional transmission organizations).

CZ103.5.2 Off-site contract. The renewable energy shall be delivered or credited to the *building site* under an energy contract duration of not less than 15 years. The contract shall be structured to survive a partial or full transfer of ownership of the building property. The total required off-site renewable energy shall be procured in equal installments over the duration of the off-site contract.

CZ103.5.3 Renewable Energy Certificate (REC) documentation. The property *owner* or owner's authorized agent shall demonstrate that where RECs are associated with on-site and off-site renewable energy production, the following criteria shall be met:

1. The RECs shall be retained and retired by, or on behalf of the property owner or tenant for a period of not less than 15 years.
2. The RECs shall be created within a 12-month period of the use of the REC.
3. The RECs represent a generating asset constructed not more than 5 years before the issuance of the certificate of occupancy.

68. **Section R105.2 Information on construction documents** is amended to read as follows:

. . .

10. Window unit area square footage as a percentage of individual wall area by specific elevation.

11. Locations for condensate drainage where *combustion equipment* for space heating and water heating is installed.

69. A new **Section R105.6 Permits** is added to read as follows:

R105.6 Permits. Procedures related to permits, required inspections, payment of fees and obtaining required approvals shall be as set forth in Chapter 1 of the adopted *International Building Code*.

70. **SECTION R106 FEES** is deleted in its entirety and replaced with the following:

SECTION R106 FEES

R106.1 Fees. All items relating to fees shall be as specified in Section 109 of the adopted *International Building Code*, entitled "FEES."

71. **SECTION R109 MEANS OF APPEALS** is deleted in its entirety and replaced with the following:

SECTION R109 MEANS OF APPEALS

R109.1 General. Appeals of decisions, determinations and interpretations of this code shall be made pursuant to the applicable provisions of Section 113 of the adopted *International Building Code*, entitled "MEANS OF APPEALS."

72. A new **SECTION R111 VIOLATIONS** is added to read as follows:

SECTION R111 VIOLATIONS

R111.1 General. Any person who violates a provision of this code or fails to comply with any of the requirements thereof or who alters or repairs a *building* or structure in violation of the approved construction documents or directive of the *code official*, or of a permit or certificate issued under the provisions of this code, commits a civil infraction and is subject to the provisions contained in § 1-15(f) of the City Code. Each day that a violation continues shall be deemed a separate offense.

73. **SECTION R202 GENERAL DEFINITIONS** is amended to modify, or add, in alphabetical order, the following definitions:

. . .

ARCHITECTURAL SHADING. Architectural shading includes roof eaves, exterior overhangs, fins, latticework, vertical trellises, horizontal pergolas, porches, and decks that block direct solar radiation in the summer.

. . .

COMBUSTION EQUIPMENT. Any equipment or appliance used for space heating, service water heating, cooking, clothes drying, or lighting that uses *fuel gas* or *fuel oil*.

. . .

74. **Section R401.2 Application** is amended to read as follows:

R401.2 Application. Residential buildings shall comply with Section R401.2.1, R401.2.2, R401.2.3 or R401.2.4, and new buildings shall comply with Appendix RZ.

Exception: *Additions*, *alterations*, *repairs* and *changes of occupancy* to *existing buildings* complying with Chapter 5.

75. **Section R401.2.1 Prescriptive compliance option** is amended to read as follows:

R401.2.1 Prescriptive compliance option. The Prescriptive Compliance Option requires compliance with Sections R401 through R404, R408 and R409 and the requirements of the sections indicated within Table R405.2(1).

76. **TABLE R402.1.2 MAXIMUM ASSEMBLY *U*-FACTORS[a] AND FENESTRATION REQUIREMENTS** is deleted in its entirety and replaced with the following:

TABLE R402.1.2 MAXIMUM ASSEMBLY *U*-FACTORS[a] AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U-FACTOR*	GLAZED VERTICAL FENESTRATION SHGC[d]	CEILING *U-FACTOR*	INSULATION ENTIRELY ABOVE ROOF DECK	WOOD FRAME WALL *U-FACTOR*[e]	MASS WALL *U-FACTOR*[b]	FLOOR *U-FACTOR*	*BASEMENT* WALL *U-FACTOR*	CRAWL SPACE WALL *U-FACTOR*
5	0.28/0.25[f]	0.50	0.35/43[g]	0.026	0.032	0.045	0.082	0.028	0.050	0.050

For SI: 1 foot = 304.8mm

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. Mass walls shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall *U*-factors shall not exceed 0.065.
c. In Warm Humid locations as defined by Figure R301.1 and Table R301.1, the basement wall *U*-factor shall not exceed 0.360.
d. The SHGC column applies to all glazed fenestration.
e. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.
f. Where the sum area of all window units within an elevation is greater than 30% of the total wall area elevation, as provided per Section R105.2 Information on construction documents, the second U-factor shall be required.
g. Where the SHGC exceeds 0.35 on wall elevations that orient west or southwest, horizontal or vertical *architectural shading* optimized for solar noon on the summer solstice shall be installed to block solar radiation.

77. **TABLE R402.1.3 INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]** is deleted in its entirety and replaced with the following:

TABLE R402.1.3 INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT *U-FACTOR*[b]	GLAZED VERTICAL FENESTRATION SHGC[b]	CEILING *R*-VALUE	INSULATION ENTIRELY ABOVE ROOF DECK	WOOD FRAME WALL *R*-VALUE[g]	MASS WALL *R*-VALUE[f]	FLOOR *R*-VALUE	*BASEMENT*[c,e] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c,e] WALL *R*-VALUE
5	0.28/0.25[h]	0.50	0.35/0.43[i]	49	30ci	30 or 20&5ci or 13&10ci or 0&20ci	13/17	38	19ci or 19 or 13&5ci or exterior 10ci	10ci, 3 ft	19ci or 19 or 13&5ci

For SI: 1 foot = 304.8 mm
ci = continuous insulation

a. *R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not less than the *R*-value specified in the table.
b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. "5ci or 13" means R-5 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 continuous insulation (ci) on the interior or exterior surface of the wall or R-13 cavity insulation on the interior side of the wall. "15ci or 19 or 13 + 5ci" means R-15 continuous insulation (ci) on the interior or exterior surface of the wall; or R-19 cavity insulation on the interior side of the wall; or R-13 cavity insulation on the interior of the wall in addition to R-5 continuous insulation on the interior or exterior surface of the wall.
d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs. The install of c*ontinuous insulation* shall be required for all heated slabs. The slab-edge insulation for heated slabs shall not be required to extend below the slab. Insulation located below grade shall be extended the distance provided in the table or to top of footing.
e. The first value is cavity insulation; the second value is continuous insulation. Therefore, as an example, "13 + 5" means R-13 cavity insulation plus R-5 continuous insulation.
f. Mass walls shall be in accordance with Section R402.2.5. The second *R*-value applies where more than half of the insulation is on the interior of the mass wall where more than half the insulation is on the interior, the mass wall *U*-factor shall be the same as the frame wall *U*- factor.
g. Class 1 vapor retarders shall not be installed on the interior of framed walls where exterior ci value is less than R-7.5.
h. Where the sum area of all window units within an elevation is greater than 30% of the total wall area elevation, as provided per Section R105.2 Information on construction documents, the second U-factor shall be required.
i. Where the SHGC exceeds 0.35 on wall elevations that orient west or southwest, horizontal or vertical *architectural shading* optimized for solar noon on the summer solstice shall be installed to block solar radiation.

78. **Section R402.2 Specific insulation requirements** is amended to read as follows:

R402.2 Specific insulation requirements. In addition to the requirements of Section R402.1, insulation shall meet the specific requirements of Sections R402.2.1 through R402.2.13. All insulation shall be installed to meet the requirements of a Grade 1 insulation installation in accordance with Appendix A of ANSI/RESNET/ICC 301.

79. **Section R402.2.5 Access hatches and doors** is amended to read as follows:

R402.2.5 Access hatches and doors. Access hatches and doors from conditioned to unconditioned spaces such as attics and crawl spaces shall be insulated to the same R-value required by Table R402.1.3 for the wall or ceiling in which they are installed.

Exceptions:

1. Vertical entries providing access from *conditioned spaces* to unconditioned spaces that are not required to be a swinging door shall be less than or equal to U-0.10 or have an average insulation *R*-value of R-10 or greater. If foam plastic insulation is used, it shall comply with Section R303.5.3 of the *International Residential Code*, entitled Attics.

. . .

80. **Section R402.2.9.1 Basement wall insulation installation** is amended to read as follows:

> **R402.2.9.1 Basement wall insulation installation.** Where *basement walls* are insulated, the insulation shall be installed from the top of the *basement wall* down to the basement floor, or in accordance with the *proposed design* or the *rated design*, as applicable.

81. **Section R402.2.10.1 Slab-on-grade floor insulation installation** is amended to read as follows:

> **R402.2.10.1 Slab-on-grade floor insulation installation.** For buildings complying with Section R401.2.1, R401.2.2, and R401.2.3, the slab edge *continuous insulation* shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall extend the distance provided in Table R402.1.3, but need not exceed the footing depth in accordance with Section R403.1.4 of the *International Residential Code*. Where a proposed design includes insulation extending away from the *building*, it shall be protected by pavement or by not less than 10 inches (254 mm) of soil. The top edge of the insulation installed between the *exterior wall* and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the *exterior wall*. Where horizontal sections of insulation not greater than 8 inches (203.2 mm) require compressive strength, a structural thermal material with an R-value not less than R-1.8 shall suffice to maintain an installation without thermal breaks. Full-slab insulation shall be continuous under the entire area of the slab-on-grade floor, except at structural column locations and service penetrations. Slab edge insulation required at the *heated slab* perimeter shall not be required to extend below the bottom of the *heated slab* and shall be continuous with the full slab insulation.

82. **Section R402.2.11.1 Crawl space wall insulation installations** is deleted in its entirety and replaced with the following:

> **R402.2.11.1 Crawl space wall insulation installations.** Where crawl space wall insulation is installed, it shall be permanently fastened to the interior or exterior wall and shall extend downward from the top of foundation wall to the footing. Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the adopted *International Building Code* or the *International Residential Code*, as applicable. Joints of the vapor retarder shall overlap by 12 inches (304.8 mm) and be sealed or taped. The edges of the vapor retarder shall extend 12 inches (304.8 mm) up stem walls and 6 inches (153 mm) up footings and shall be attached and sealed to the stem walls and footing pads.

83. **TABLE R402.5.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]** is amended to read as follows:

TABLE R402.5.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	The *building*'s thermal envelope shall contain a continuous air barrier that is in alignment with the insulation on the conditioned and unconditioned side of the assembly.[b] All penetrations, breaks or joints in the air barrier shall be air sealed.	Air-permeable insulation shall be enclosed inside the air barrier assembly.[b]
. . .	. . .	. . .
Walls	The junction of the foundation and the sill plate shall be sealed. The junction of the top plate and the top of exterior walls and interior walls that are adjacent to or abut unconditioned space shall be sealed. Knee walls shall have an air barrier installed on both sides of the insulation and be sealed on all edges.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, *R*-value, of not less than R-3 per inch. Exterior building thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Knee wall	Knee walls shall have an air barrier installed on both sides of the insulation and be sealed on all edges.	Insulation installed in a knee wall assembly shall be installed in accordance with Section R402.2.3. Air-permeable insulation shall be enclosed inside an air barrier assembly.
. . .	. . .	. . .
Rim joists	Rim joists shall include an exterior air barrier.[b] The junctions of the rim board to the sill plate and the rim board and the subfloor shall be air sealed.	Rim joists shall be insulated so that the insulation maintains permanent contact with the exterior rim board[b]
. . .	. . .	. . .

a. Inspection of log walls shall be in accordance with the provisions for ICC 400.
b. Air barrier and insulation full enclosure is not required in unconditioned/ventilated attic spaces and rim joists.

84. **Section R402.5.1.2 Air leakage testing** is amended to read as follows, with Exception 1 being deleted in its entirety:

R402.5.1.2 Air leakage testing. The *building* or each *dwelling unit* or *sleeping unit* in the *building* shall be tested for air leakage. Testing shall be conducted in accordance with ANSI/RESNET/ICC 380, ASTM E779, ASTM E1827 or ASTM E3158. Testing shall also be conducted in accordance with the *City of Fort Collins Building Code Residential Air Tightness Testing Protocol*, *New Attached and Detached Single Family Dwellings*, dated December 16, 2025 (Ordinance No. 212, 2025), and reported at a pressure differential of 0.2-inch water gauge (50 Pa). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall identify the technician conducting the test and their applicable testing certifications, and shall be signed

by the technician conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope* have been sealed.

During testing:

. . .

6. Supply and return registers, where installed at the time of the test, shall be fully open.
7. The connection to an attached garage(s) must be verified either as not exceeding 5 Pa, as tested pressure not lower than -45 Pa with respect to (WRT) house at a pressure differential of 0.2 inch water gauge (50 Pa), or as not exceeding 100 CFM with respect to (WRT) house through the Open a Door test as documented in the *City of Fort Collins Building Code Air Tightness Testing Protocol, New Attached and Detached Single Family Dwellings*.

Exception: Where tested in accordance with Section R402.5.1.2.1, testing of each *dwelling unit* or *sleeping unit* is not required.

85. **Section R402.5.1.2.1 Unit sampling** is amended to read as follows:

R402.5.1.2.1 Unit sampling. For *buildings* with eight or more *dwelling units* or *sleeping units*, a minimum of seven or 20 percent of the *dwelling units* or *sleeping units,* whichever is greater, shall be tested including one of each unit type and a like number of units on each floor. Where the air leakage rate of a tested unit is greater than the maximum permitted rate, corrective actions shall be taken and the unit retested until it passes. For each tested *dwelling unit* or *sleeping unit* with an air leakage rate greater than the maximum permitted rate, three additional units, including the corrected unit, shall be tested. Where *buildings* have fewer than eight *dwelling units* or *sleeping units,* each unit shall be tested.

86. **Section R402.5.1.3 Maximum air leakage rate** is amended to read as follows:

Section R402.5.1.3 Maximum air leakage rate. Where tested in accordance with Section R402.5.1.2, the air leakage rate for *buildings*, *dwelling units* or *sleeping units* shall be as follows:

1. Where complying with Section R401.2.1, R401.2.2 or R401.2.3, the *building* or the *dwelling units* or *sleeping units* in the *building* shall have an air leakage rate not greater than 3.0 air changes per hour or 0.16 CFM per square foot of *testing unit enclosure area*.

Exception: Where *dwelling units* or *sleeping units* are attached or located in an R-2 occupancy, and are tested without simultaneously

testing adjacent *dwelling units* or *sleeping units*, the air leakage rate is permitted to be not greater than 0.27 cubic feet per minute per square foot [1.4 L/(s × m^2)] of the *testing unit enclosure area*. Where adjacent *dwelling units* are simultaneously tested in accordance with ASTM E779, the air leakage rate is permitted to be not greater than 0.27 cubic feet per minute per square foot [1.4 L/(s × m^2)] of the *testing unit enclosure area* that separates *conditioned space* from the exterior.

87. **Section R402.6 Maximum fenestration *U*-factor and SHGC** is amended to read as follows:

R402.6 Maximum fenestration *U*-factor and SHGC. The area-weighted average maximum *fenestration U-factor* permitted using tradeoffs from Section R402.1.5 or R405 or R406 shall be 0.32 for vertical *fenestration*, and 0.75 for skylights. The area-weighted average maximum *fenestration SHGC* permitted using tradeoffs from Section R405 or R406 shall be 0.35. Fenestration with an *SHGC* not greater than 0.43 shall be permitted, but where installed on wall elevations that orient west or southwest, horizontal or vertical *architectural shading* optimized for solar noon on the summer solstice shall be installed to block solar radiation.

Exception: The maximum *U-factor* and *SHGC* for *fenestration* shall not be required in storm shelters complying with ICC 500.

88. **Section R403.1.2 Heat pump supplementary heat** is amended to read as follows:

R403.1.2 Heat pump supplementary heat. Heat pumps having supplementary electric-resistance, *fuel gas* or *liquid fuel* heating systems shall have controls that are configured to prevent supplemental heat operation when the capacity of the heat pump compressor can meet the heating load and when outdoor temperature exceeds 15°F (-9.4°C). Supplemental heat operation shall be limited to only where one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the *thermostat* setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The *thermostat* malfunctions.

75. **Section R403.3.4 Duct systems located in conditioned space** is deleted in its entirety and replaced with the following:

R403.3.4 Ducts located in conditioned space. For *ductwork* to be considered inside *conditioned space*, the *space conditioning equipment* and *duct system* shall be located completely within the *building thermal envelope* and air barrier boundary.

76. **Section R403.3.8 Duct system leakage** is amended to read as follows:

R403.3.8 Duct system leakage. The total measured *duct system* leakage shall not be greater than 4.0 cubic feet per minute (113.2 L/min) per 100 square feet of the *conditioned floor area*. For *buildings* complying with Section R405 or R406, where *duct system* leakage to outside is tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554, the leakage to outside value shall not be used for compliance with this section, but shall be permitted to be used in the calculation procedures of Section R405 and R406. Where *space conditioning equipment* is not installed at time of testing, the supply and return *duct system* leakage shall not be greater than 3.0 cubic feet per minute (84.9 L/min) per 100 square feet (9.3 m^2) of the conditioned floor area.

77. **Section R403.3.9 Unit sampling** is amended to read as follows:

R403.3.9 Unit sampling. For *buildings* with eight or more *dwelling units* or *sleeping units,* the *duct systems* in the greater of seven or 20 percent of the *dwelling units* or *sleeping units*, including one of each unit type and a like number of units on each floor, shall be tested. Where buildings have fewer than eight *dwelling units* or *sleeping units*, the *duct systems* in each unit shall be tested. Where the leakage of a *duct system* is greater than the maximum permitted *duct system* leakage, corrective actions shall be made to the *duct system* and the *duct system* shall be system retested until it passes. For each tested *dwelling unit* or *sleeping unit* that has a greater total duct system leakage than the maximum permitted *duct system* leakage, an additional three *dwelling units* or *sleeping units*, including the corrected unit, shall be tested.

78. **Section R403.4.1 Protection of piping insulation** is amended to read as follows:

R403.4.1 Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, physical contact and wind. The protection shall provide shielding from solar radiation that can cause degradation of the material and shall be removable not less than 6 feet (1828 mm) from the equipment for maintenance. Adhesive tape, paint products and similar applications that require maintenance shall be prohibited.

79. A new **Section R403.5.4 Demand responsive water heating** and **TABLE R403.5.4 DEMAND RESPONSIVE CONTROLS FOR WATER HEATING** are added to read as follows:

R403.5.4 Demand responsive water heating. Storage water heaters that use electricity for water heating with a rated water storage volume of 40 gallons (150 L) to 120 gallons (450 L) and a nameplate input rating equal to or less than 12 kW shall be provided with *demand responsive controls* in accordance with Table R403.5.4.

Exceptions:

1. Water heaters that are required to provide a constant hot water delivery temperature of 180°F (82°C) or greater.
2. Water heaters that comply with Section IV, Part HLW or Section X of the *ASME Boiler and Pressure Vessel Code*.
3. Water heaters that use three-phase electric power.

TABLE R403.5.4 DEMAND RESPONSIVE CONTROLS FOR WATER HEATING

Equipment Type	Controls	
	Manufactured before 7/1/2025	**Manufactured on or after 7/1/2025**
Electric storage water heaters	AHRI 1430 (I-P) or ANSI/CTA-2045-B Level 1 and also capable of initiating water heating to meet the temperature set point in response to a *demand response signal*.	AHRI 1430 (I-P)

80. **Section R403.6.3 Testing** is amended by deleting Exception 3.

81. **Section R403.6.4 Unit sampling** is deleted in its entirety.

82. **Section R403.7 Equipment sizing and efficiency rating** is amended to read as follows:

R403.7 Equipment sizing and efficiency rating. Heating and cooling *equipment* shall be designed and sized in accordance with Section M1401.3 of the *International Residential Code*, and performance will be performance tested and verified in accordance with Section M1309 of the *International Residential Code*.

83. **Section R403.7.1 Electric-resistance space heating** is amended to read as follows:

R403.7.1 Electric-resistance space heating. Detached one- and two-family dwellings, townhouses and *dwelling units* using electric-resistance space heating shall limit the total installed heating capacity of all electric-resistance space heating serving the *dwelling unit* to not more than 2.0 kW or shall install a heat pump in accordance with Section R403.7.2 in the largest space that is not used as a bedroom.

84. A new **Section R403.7.2 Space heating for electrification** is added to read as follows:

R403.7.2 Space heating for electrification. Space heating equipment shall be constructed with or pre-wired to support a ground-source electric heat pump or an electric cold climate heat pump that is specifically designed to heat at the Winter Outdoor, Design Dry-Bulb temperature defined in Section C302.1. Supplementary heat shall meet the requirements of Section R403.1.2.

85. **Section R404.4 Renewable energy certificate (REC) documentation** is deleted in its entirety.

86. **Section R405.1 Scope** is amended to read as follows:

R405.1 Scope. This section establishes criteria for compliance using *simulated building performance* analysis. Such analysis shall include heating, cooling, mechanical *ventilation* and service water-heating energy only.

87. A new **Section R405.1.1 Space heating for electrification** is added to read as follows:

R405.1.1 Space heating for electrification. In addition to all required sections, new *buildings*, *additions*, or *alterations* where the primary heat source is electrical shall comply with Section R403.7.2.

88. **Section R405.2 Simulated building performance compliance** and **TABLE R405.2 REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE** are amended to read as follows:

R405.2 Simulated building performance compliance. Compliance based on *simulated building performance* requires that a *building* comply with the following:

1. The requirements of the sections indicated within Table R405.2(1).

. . .

TABLE R405.2(1) REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE AND PRESCRIPTIVE COMPLIANCE

SECTION[a]	TITLE
. . .	. . .
Mechanical	
. . .	. . .
TABLE R405.2(2)	Compactness of the hot water distribution system
. . .	. . .

. . .

89. A new **TABLE 405.2(2) COMPACTNESS OF THE HOT WATER DISTRIBUTION SYSTEM** is added to read as follows:

TABLE R405.2(2) COMPACTNESS OF THE HOT WATER DISTRIBUTION SYSTEM

HWDS = factor for the compactness of the hot water distribution system.

Compactness ratio[a] factor[b]		**HWDS**
1 story	2 or more stories	
≤ 60% or ≤ 70% stacked Multi-Family units	≤ 30%	0.05

a. The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source of hot water and the fixtures that it serves (the "hot water rectangle") divided by the floor area of the dwelling, defined as any occupiable living space where plumbing fixtures may exist.
   1. Sources of hot water include water heaters, or in multifamily *buildings* with central water heating systems, circulation loops or electric heat traced pipes.
   2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
   3. The hot water rectangle shall be shown on the floor plans and the areas shall be computed to the nearest square foot.
   4. Where there is more than one water heater, and each water heater serves different plumbing fixtures and appliances it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.
   5. The basement, crawl space, or attic shall be counted as a story when it contains the water heater. The attic or crawl space areas do not contribute to the floor area of the dwelling.
   6. Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the floor area of the dwelling and identifying the appropriate compactness ratio and *HWDS* factor.

b. Failure to meet compliance with the Compactness ratio factor shall require a hot water circulation system in the dwelling unit. This system shall have controls that comply with Section R403.5.1.1.1 or Section C404.6.1.1 and shall have no more than 16 ounces in the piping from the circulation loop to the plumbing fixtures and appliances. The volume shall be calculated in accordance with TABLE C404.5.2.1.

90. **Section R405.5.4.2 Compliance report for certificate of occupancy** is amended to read as follows:

R405.5.4.2 Compliance report for certificate of occupancy. A compliance report generated for submission prior to obtaining the certificate of occupancy shall include the following:

. . .

8. A passing "Confirmed" energy rating report, including the Home Energy Rating Certificate with corresponding Home Energy Rating System (HERS) score, reflecting as-built data, is required to receive a Certificate of Occupancy for final approval of a completed home.

91. **TABLE R406.2 REQUIREMENTS FOR ENERGY RATING INDEX** is amended to read as follows:

TABLE R406.2 REQUIREMENTS FOR ENERGY RATING INDEX	
SECTION[a]	**TITLE**
. . .	. . .
Building Thermal Envelope	
. . .	. . .
R402.6	Maximum fenestration *U-Factor* and SHGC
. . .	. . .
Mechanical	
. . .	. . .
R403.7	Equipment sizing and efficiency rating
. . .	. . .
TABLE R405.2(2)	Compactness of the hot water distribution system
. . .	. . .
Other	
R409	Electric ready and solar ready

a. Reference to a code section includes all of the relative subsections except as indicated in the table.
b. The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source of hot water and the fixtures that it serves (the "hot water rectangle") divided by the floor area of the dwelling, defined as any occupiable living space where plumbing fixtures may exist.
   1. Sources of hot water include water heaters, or in multifamily *buildings* with central water heating systems, circulation loops or electric heat traced pipes.
   2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
   3. The hot water rectangle shall be shown on the floor plans and the areas shall be computed to the nearest square foot.
   4. Where there is more than one water heater, and each water heater serves different plumbing fixtures and appliances it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.
   5. The basement, crawl space, or attic shall be counted as a story when it contains the water heater. The attic or crawl space areas do not contribute to the floor area of the dwelling.
   6. Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the floor area of the dwelling and identifying the appropriate compactness ratio and *WDS* factor.
c. Failure to meet compliance with the Compactness ratio factor shall require a hot water circulation system in the dwelling unit. This system shall have controls that comply with Section R403.5.1.1.1 or Section C404.6.1.1 and shall have no more than 16 ounces in the piping from the circulation loop to the plumbing fixtures and appliances. The volume shall be calculated in accordance with TABLE C404.5.2.1.

92. **Section R406.7.2.2 Confirmed compliance report for a certificate of occupancy** is amended to read as follows:

R406.7.2.2 Confirmed compliance report for a certificate of occupancy. A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

. . .

7. A passing "Confirmed" energy rating report that includes a registry ID from the overseeing organization, reflecting as-built data, is

required to receive a Certificate of Occupancy for final approval of a completed home.

93. A new **SECTION R409 ELECTRIC READY AND SOLAR READY** is added to read as follows:

SECTION R409 RESIDENTIAL ELECTRIC READY AND SOLAR READY

R409.1 Scope. This section establishes requirements for electric readiness and solar readiness in *residential buildings*.

R409.2 Compliance. *Residential buildings* shall comply with Sections R409.3 through R409.4.

R409.3 Electric ready.

R409.3.1 General. The provisions of Section R409.3 shall apply to all new *buildings*, major renovations, and *additions*.

R409.3.2 Additional electric infrastructure. *Combustion equipment* in *residential buildings* shall meet the requirements of Sections R409.3.2.1 through R409.3.2.5.

Exceptions:

1. Interior fireplaces that do not serve as a primary source of heating.
2. Exterior fireplaces and firepits.

R409.3.2.1 Combustion equipment. *Combustion equipment* shall be provided with all of the following:

1. A dedicated, appropriately phased branch circuit sized to accommodate *future electric equipment* or appliances to serve a comparable capacity to meet the heating load.

   1.1 The branch circuits serving future electric clothes drying equipment and cooking equipment shall be sized with a rating not less than 240 volts and not less than 30 amperes.

2. An electric receptacle or junction box that meets the requirements of Section R409.3.2.4 and is connected to the electrical panel through the branch circuit. Each electrical receptacle or junction box shall have reasonable access to the *combustion equipment* or dedicated physical space for *future electric equipment* with no obstructions other than the current *combustion equipment*.

3. Where *combustion equipment* is used for space or water heating, dedicated physical space shall be provided for *future electric equipment*, including an electric resistance backup coil for ducted systems, if applicable. Physical space occupied by existing *combustion equipment* shall be permitted to count towards satisfying the physical space requirement, subject to approval by the *code official*.

Exception: *Dwelling units* with installed air conditioning systems are not required to provide additional dedicated physical space for an outdoor heat pump.

R409.3.2.2 Electrical panel space. The electrical panel shall have a reserved space for a minimum two-pole circuit breaker for each branch circuit provided for *future electric equipment* or appliances. The electrical panel shall be sized for the electrical load necessary to meet an equivalent electrical load for any *combustion equipment*. Electrical loads shall be calculated in accordance with the *National Electrical Code*.

R409.3.2.3 Labeling. The junction box or receptacle and the dedicated circuit breaker space serving *future electric equipment* or appliances in the electrical panel shall be labeled for their intended use.

R409.3.2.4 Adjacency. The electrical receptacle or junction box must be provided within 3 feet of the *combustion equipment* or appliances, or within 3 feet of the dedicated physical space for *future electric equipment* or appliances.

Exception: For *combustion equipment* dedicated to space or water heating, the electrical receptacle or junction box shall be located not more than 6 feet from the *combustion equipment* or the dedicated physical space for *future electric equipment*.

R409.3.2.5 Condensate drain. Where *combustion equipment* for space heating and water heating is installed, a location shall be provided for condensate drainage.

R409.4 Solar ready.

R409.4.1 General. The provisions of Section 409.4 shall apply to new *buildings*, and major renovations and *additions*.

R409.4.2 Solar-ready zone for single family and townhouses. New detached one- and two-family dwellings and townhouses with at least 600 square feet (55.7 m^2) of roof area that is either oriented between 110 degrees and 270 degrees of true north or a low sloped roof shall comply with Sections R409.4.2.1 through R409.4.2.8.

Exceptions:

1. New detached one- and two-family dwellings and townhouses with a permanently installed on-site renewable energy system that provides electricity to the *dwelling unit's* electrical system.

2. A detached one- or two-family dwelling or townhouse where all areas of the roof that would otherwise meet the requirements of this section are in full or partial shade for more than 70 percent of daylight hours annually.

R409.4.2.1 Construction document requirements for solar-ready zone. Construction documents shall indicate the *solar-ready zone*.

R409.4.2.2 Solar-ready zone areas. The total *solar-ready zone* area for each detached one- or two-family dwelling or townhouse shall be at least 300 square feet (27.9 m^2) exclusive of mandatory access or setback areas required by the *International Fire Code*. The *solar-ready zone* shall be composed of areas at least 5 feet (1524 mm) in width and at least 80 square feet (7.43 m^2) exclusive of access or setback areas required by the *International Fire Code*.

Exception: New townhouses three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (185.8 m^2) of conditioned space per townhouse unit shall have a *solar-ready zone* area of at least 150 square feet (13.9 m^2).

R409.4.2.3 Obstructions. *Solar-ready zones* shall be free from obstructions, including but not limited to vents, chimneys, and roof-mounted equipment.

R409.4.2.4 Shading. The *solar-ready zone* shall be set back from any existing or new permanently affixed object on the *building* or site that is located south, east, or west of the *solar-ready zone* a distance not less than two times the object's height above the nearest point on the roof surface. Such objects include, but are not limited to, taller portions of the building itself, parapets, chimneys, antennas, signage, rooftop equipment, trees, and roof plantings either existing at the time of permit application or planned for on the construction documents.

R409.4.2.5 Roof load documentation. The structural design loads of roof dead load and roof live load shall be clearly indicated on the construction documents.

R409.4.2.6 Interconnection pathway. Construction documents shall indicate at least one potential pathway for routing of conduit and/or raceway

from the *solar-ready zone* to the electrical service panel and shall be labeled as “Potential Pathway” on the construction documents.

R409.4.2.7 Electrical service reserved space. The main electrical service panel shall have sufficient reserved space, which shall be labeled “For Future Solar Electric,” to allow the installation of a dual pole circuit breaker for future solar electric installation. The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

R409.4.2.8 Construction documentation certificate. A permanent certificate, indicating the *solar-ready zone* and other requirements of Sections R409.4.2.1 through R409.4.2.7, shall be posted near the electrical distribution panel, water heater, or another conspicuous location.

R409.4.3 Solar-ready zone for multifamily. New Group R-2, R-3, and R-4 *buildings* three stories or less in height above *grade plane* that have a roof oriented between 110 and 270 degrees of true north or have low-sloped roofs shall have a *solar-ready zone* that complies with Sections R409.4.3.1 through R409.4.3.6.

Exceptions:

1. A *building* with a permanently installed, on-site renewable energy system that meets the following criteria:
   1.1 The system produces the energy output equivalent to covering 40 percent of the net roof area with solar photovoltaic calculated as the horizontally projected gross roof area less the area covered by skylights, occupied roof decks, vegetative roof areas, and mandatory access or setback areas required by the *International Fire Code*.
   1.2 The system is located on the roof or overhang of the *building* or on the roof or overhang of another structure located within 250 feet (76200 mm) of the *building*, on the *building site*, on covered parking, or another *approved* location installed with the *building* project and under the same property ownership.
2. A *building* with a *solar-ready zone* that is shaded for more than 70 percent of daylight hours annually.
3. A *building* where a licensed design professional certifies that the incident solar radiation available to the *building* is not suitable for a *solar-ready zone*.
4. A building where a licensed design professional certifies that the *solar-ready zone* area required by Section R409.4.3.2 cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas, or other obstructions.

R409.4.3.1 Construction document requirements for solar-ready zone. Construction documents shall indicate the *solar-ready zone*.

R409.4.3.2 Solar-ready zone area. The total *solar-ready zone* area shall be at least 40 percent of the roof area calculated as the horizontally projected gross roof area less the area covered by skylights, occupied roof decks, vegetative roof areas, and mandatory access or setback areas required by the *International Fire Code*. The *solar-ready zone* shall be a single area or smaller, separated sub-zone areas. For sloped roofs, each sub-zone area shall be at least 200 square feet (18.6 m^2) and no side of any rectangular area shall be less than 11 feet (3.35 m) in length. For low-sloped or flat roofs, each sub-zone area shall be at least 330 square feet (30.7 m^2), with a minimum length running generally north to south of 15 feet (4.57 m) and a minimum length running generally east to west of 22 feet (6.7 m), and no side of any rectangular area shall be less than 11 feet (3.35 m) in length. The *solar-ready zone* shall be located on the roof or overhang of the *building* or on the roof or overhang of another structure located within 250 feet of the *building*, on the *building site*, on covered parking, or another *approved* location installed with the *building* project and under the same property ownership.

R409.4.3.3 Obstructions. *Solar-ready zones* shall be free from obstructions, including pipes, vents, ducts, HVAC equipment, skylights, and roof-mounted equipment.

R409.4.3.4 Roof loads and documentation. The structural design loads for roof dead load and roof live load shall be indicated on the construction documents.

R409.4.3.5 Interconnection pathway. Construction documents shall indicate at least one potential pathway for routing of conduit and/or raceway from the *solar-ready zone* to an electrical service panel and shall be labeled as “Potential Pathway” on the construction documents.

R409.4.3.6 Electrical service reserved space. The main electrical service panel shall have a minimum bus bar rating of not less than 200 amps. The main electrical service panel shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric. This space shall be labeled “For Future Solar Electric.” The reserved space shall be positioned at the end of the panel that is opposite from the panel supply conductor connection.

R409.4.4 Electric service reserved space for solar capacity. The main electrical service panel shall have sufficient reserved space, which shall be labeled “For Future Solar Electric,” to allow installation of a dual pole circuit breaker for future solar electric installation. The reserved space shall be

positioned at the opposite (load) end from the input feeder location or main circuit location.

Exception: A *residential building* that already must comply with the solar ready provisions of either Section R409.4.2 or R409.4.3 or that has a permanently-installed on-site renewable energy system that provides electricity to the *building's* electrical system.

94. **Section R501.2 Compliance** is amended to read as follows:

. . .

Exception: *Additions*, *alterations*, *repairs* or changes of occupancy do not need to comply with the requirements of Section R402.2.10 Slab-on-grade floors when it would require the demolition of existing permanent building construction components.

95. **Section R502.2 Prescriptive compliance** is amended to read as follows:

R502.2 Prescriptive compliance. Additions shall comply with Sections R502.2.1 through R502.3.

96. **Section R502.2.1 Building thermal envelope** is amended to read as follows:

R502.2.1 Building thermal envelope. New *building thermal envelope* assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, R402.4.1 through R402.4.5, and R402.5.

Exceptions:

1. New *building thermal envelope* assemblies are exempt from the requirements of Section R402.5.1.2.
2. Where new construction roof lines for *additions* are built to match existing roof lines, a minimum of uncompressed R-16 insulation extending over the wall top plate at the eaves shall be allowed.
3. Where demolition of existing permanent building construction components is required to meet the requirements of Section R402.2.10, Slab-on-grade floors.

97. **Section R502.2.2 Heating and cooling systems** is amended to read as follows:

R502.2.2 Heating and cooling systems. New HVAC systems installed as part of an *addition* shall comply with Section R403 and with Section M1309 of the *International Residential Code*.

Exception: Where ductwork from an existing heating and cooling system is extended to an *addition*, Sections R403.3.7 and R403.3.8 shall not be required.

98. A new **Section R502.3 Compliance** is added to read as follows:

R502.3 Compliance. An *addition* shall be deemed to comply with this code either where the *existing building* with the *addition* complies prescriptively (using the Component performance alternative), or where the *existing building* with the *addition* does not use more energy than the *existing building* without the *addition* and demonstrates compliance using either Simulated building performance energy cost or ERI compliance option listed below. *Existing building* envelope and energy features shall be determined in accordance with ANSI/RESNET/ICC 301 standard.

Exceptions: Unaltered portions of the *existing building* or *building* system are not required to comply with this code section if at least one of the following is true:

1. The *existing building* was constructed to the *2012 International Energy Conservation Code* or a later version.
2. The *addition* is less than 30% of the total conditioned floor area of the *existing building*.
3. The *building* has undergone documented energy efficiency upgrades to the envelope within the last 10 years.

99. A new **Section R502.3.1 Existing plus addition (Prescriptive compliance)** is added to read as follows:

R502.3.1 Existing plus addition (Prescriptive compliance). Component performance alternative compliance verification completed in accordance with Section R402.1.5 shall demonstrate that the existing *building* plus the *addition*, has a total thermal conductance that is less than or equal to the total thermal conductance of the existing *building* prior to the *addition*. This method requires the project to create two Component performance alternative compliance verification reports as outlined in Section R502.3.1.1.

100. A new **Section R502.3.1.1 Reporting** is added to read as follows:

R502.3.1.1 Reporting. The following are required at time of permit application submittal:

1. A Component performance alternative compliance benchmark report of the existing structure prior to construction.
2. A Component performance alternative compliance report of the existing *building*, plus the *addition* based on the proposed design.

101. A new **Section R502.3.2 Existing building plus addition compliance (Simulated Building Performance)** is added to read as follows:

R502.3.2 Existing building plus addition compliance (Simulated Building Performance). Simulated building performance compliance verification completed in accordance with Section R405 shall demonstrate that the existing *building* plus the *addition* uses no more energy than the existing *building* did prior to the *addition*. This method requires the project to create cost compliance verification reports at three stages as outlined in Section R502.3.2.2.

102. A new **Section R502.3.2.2 Reporting** is added to read as follows:

R502.3.2.2 Reporting. The following are required at time of permit application submittal:

1. A baseline Simulated building performance cost compliance report of the existing structure prior to construction.
2. A projected Simulated building performance cost compliance report of the existing *building* plus the *addition* based on the proposed design for the *building* in its entirety.

For Certificate of Occupancy, a final confirmed Simulated building performance cost compliance report shall be submitted prior to final inspection.

103. A new **Section R502.3.3 Existing plus addition compliance (Energy Rating Index (ERI) Alternative)** is added to read as follows:

R502.3.3 Existing plus addition compliance (Energy Rating Index (ERI) Alternative). An ERI score shall demonstrate that the existing *building* plus the *addition* uses no more energy than the existing *building* did prior to the *addition*. This method requires the project to obtain an ERI score at three stages as outlined in Section R502.3.3.1.

104. A new **Section R502.3.3.1 Reporting** is added to read as follows:

R502.3.3.1 Reporting. For permitting, the following are required:

1. A baseline ERI score of the existing structure prior to construction.
2. A projected ERI score of the existing *building* plus the *addition* based on the proposed design for the *building* in its entirety.

For Certificate of Occupancy, a confirmed ERI report shall be submitted prior to final inspection.

105. A new **Appendix RZ Residential Performance Path to Zero Carbon Building** is added to read as follows:

APPENDIX RZ

RESIDENTIAL PERFORMANCE PATH TO ZERO CARBON BUILDING

SECTION RZ101
GENERAL

RZ101.1 Purpose. This appendix provides requirements to be applied over the course of the 2024, 2027, and 2030 code cycles that will result in all new residential buildings reaching zero carbon by the 2030 code. Appendix RZ is specifically for new residential buildings as defined in Chapter 2. The Zero Carbon Residential Building Provisions are designed to work with residential occupancies where the Energy Rating Index (ERI) can be applied including one- and two-family dwellings and townhouses as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane. This appendix is not intended to apply to existing building projects as the ERI values used in the appendix were determined based on analysis for new construction building projects.

RZ101.2 Scope. New *residential buildings* shall comply with the requirements of this appendix.

RZ101.3 Application. *Residential buildings* shall comply with Section R406 except as amended by this appendix.

> **Exception:** *Additions*, *alterations*, *repairs* and changes of occupancy to *existing buildings* complying with Chapter 5.

RZ101.4 Certificate. A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory *label*, service disconnect *label* or other required labels. The certificate shall indicate the following:

1. The predominant *R-values* of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, *crawl space walls* and floors and *ducts* outside *conditioned spaces*.
2. *U*-factors of *fenestration* and the *solar heat gain coefficient* (SHGC) of *fenestration*. Where there is more than one value for any component of the *building thermal envelope*, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.
3. The results from any required *duct system* and *building thermal envelope* air leakage testing performed on the *building*.
4. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency is not required to be indicated for gas-fired unvented room heaters, electric furnaces or electric baseboard

heaters.

5. Where on-site photovoltaic panel systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.
6. For *buildings* where an *Energy Rating Index* score is determined in accordance with Section R406, the *Energy Rating Index* score and *CO_2e Index*, both with and without any on-site generation, shall be listed on the certificate.
7. The code edition under which the structure was permitted.
8. Where a *solar-ready zone* is provided, the certificate shall indicate its location and dimensions.

SECTION RZ102
GENERAL DEFINITIONS

CO_2e INDEX. A numerical integer value, calculated in accordance with ANSI/RESNET/ICC 301, that represents the relative Carbon Dioxide equivalence (CO_2e) emissions of a *rated design* as compared with the CO_2e emissions of the CO_2e reference design, where an Index value of 100 represents the CO_2e performance of the CO_2e reference design and an Index value of 0 (zero) represents a home that emits zero net CO_2e annually.

COMMUNITY RENEWABLE ENERGY FACILITY (CREF). A facility that produces energy from *renewable energy resources* and that is qualified as a community energy facility under applicable jurisdictional statutes and rules.

FINANCIAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (FPPA). A financial arrangement between a renewable electricity generator and a purchaser wherein the purchaser pays or guarantees a price to the generator for the project's renewable generation. Also known as a financial power purchase agreement and virtual power purchase agreement.

PHYSICAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPPA). A contract for the purchase of renewable electricity from a specific renewable electricity generator by a purchaser of renewable electricity.

SECTION RZ103
ZERO NET ENERGY RESIDENTIAL BUILDINGS

RZ103.1 Scope. This section establishes criteria for compliance using an *Energy Rating Index* (ERI) analysis. Such analysis shall be limited to *dwelling units*. Spaces other than *dwelling units* in Group R-2, R-3 or R-4 buildings shall comply with Sections R402 through R404.

RZ103.2 ERI compliance. Compliance based on the *ERI* requires that the *rated design* meets the requirements indicated within Table R406.2 and Section RZ103.

RZ103.3 Building thermal envelope. The *building thermal envelope* shall comply with Section R406.3.

RZ103.4 Energy Rating Index. The *Energy Rating Index* (ERI) shall be determined in accordance with ANSI/RESNET/ICC 301. Where a CREF provides electrical energy or where electrical energy is provided by a PPPA or FPPA in accordance with Section RZ103.4.1, the on-site power production (OPP) shall be adjusted in accordance with Equation RZ-1.

Equation RZ-1 $Adjusted\ OPP = OPP_{kWh} + CREF_{kWh} + PPPA_{kWh} + FPPA_{kWh}$

where:

OPP_{kWh} = Annual electrical energy from *on-site renewable energy*, in units of kilowatt-hours (kWh).

$CREF_{kWh}$ = Annual electrical energy from a CREF, in kWh.

$PPPA_{kWh}$ = Where not included as OPP, the annual electrical energy contracted from a PPPA, in kWh.

$FPPA_{kWh}$ = Where not included as OPP, the annual electrical energy contracted from a FPPA, in kWh.

RZ103.4.1 Renewable energy contract. To receive $CREF_{kWh}$ or $PPPA_{kWh}$ or $FPPA_{kWh}$ credit, the renewable energy shall be delivered or credited to the *building site* under an energy contract with a duration of not less than 15 years. The contract shall be structured to survive a partial or full transfer of ownership of the building property. The renewable capacity credited to the dwelling shall not be credited to any other entity.

RZ103.5 ERI and CO_2e Index compliance (replaces Section R406.2). Compliance based on the *ERI* and *CO_2e Index* requires that the *rated design* and as-built *dwelling unit* meet all of the following requirements:

1. Maximum *ERI* values shall be as indicated in Table RZ103.5.
2. Maximum *CO_2e Index* shall be as indicated in Table RZ103.5, and determined in accordance with ANSI/RESNET/ICC 301. Where a *CREF* provides electrical energy or where electrical energy is provided by a *PPPA* or *FPPA* in accordance with Section RZ103.4.1, the on-site power production (OPP) shall be adjusted in accordance with Equation RZ-2.

Equation RZ-2 $Adjusted\ OPP = OPP_{kWh} + CREF_{kWh} + PPPA_{kWh} + FPPA_{kWh}$

where:

OPP_{kWh} = Hourly electrical energy from *on-site renewable energy*, in units

of kilowatt-hours (kWh).

CREF$_{kWh}$ = Hourly electrical energy from a *CREF*, in units of kilowatt-hours (kWh).

PPPA$_{kWh}$ = Where not included as OPP, the hourly electrical energy contracted from a *PPPA*, in units of kilowatt-hours (kWh).

FPPA$_{kWh}$ = Where not included as OPP, the hourly electrical energy contracted from a FPPA, in units of kilowatt-hours (kWh).

Any electrical storage system impacts, including electrical losses, that adjust the time of delivered renewable energy shall be included.

TABLE RZ103.5 MAXIMUM ENERGY RATING AND CO2e INDEX

Date of adoption of amended IECC Code	**2024**	**2027**[b]	**2030**[b]
Energy Rating Index (ERI) Not Including Renewable Energy	50	46	42
CO_2e Index Including Adjusted OPP[a]	50	25	0

a. CO_2e values will typically be equal to or lower than ERI values.
b. These are projected ERI and CO_2e targets for buildings constructed under the 2027 and 2030 code cycles. These targets are not required for the 2024 code cycle.

RZ103.6 Verification by approved agency. Verification shall comply with Section R406.6.

RZ103.7 Documentation. Documentation shall comply with Section R406.7.

RZ103.7.1 Confirmed compliance report for a certificate of occupancy (replaces Section R406.7.2.2). A confirmed compliance report submitted for obtaining the certificate of occupancy shall be site- and address-specific and shall include the following:

1. Building street address or other *building site* identification.
2. Declaration of *ERI* and *CO_2e Index* on title page and on *building* plans.
3. The name of the individual performing the analysis and generating the report.
4. The name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the *ERI reference design* and the as-built *dwelling unit*. A final confirmed certificate indicating that the as-built *building* has been verified to comply with Sections R406.2, R406.4 and R406.5. The certificate shall report the energy features that were confirmed to be in the *building*, including component level insulation *R*-values or *U*-factors; results from any required *duct system* and *building thermal envelope* air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical *ventilation* and service water-heating equipment installed. The

certificate shall report the estimated *dwelling unit* energy use by fuel type, inclusive of all end uses.

6. Where *on-site renewable energy* systems have been installed on or in the *building*, the certificate shall report the following:

    6.1. Type
    6.2. Production size
    6.3. The registered ERI value with renewables
    6.4. The ERI without renewable energy that complies with Table RZ103.5 and the rated renewable energy system power.

7. Where *off-site renewable energy* systems have been installed on or in the *building*, the certificate shall report the following:

    7.1. The registered *CO_2e Index* without the off-site power
    7.2. The *CO_2e Index* that complies with Table RZ103.5 with the purchased renewable energy.

8. Compliance with RZ103.4.1 shall require submittal of a copy of the contract for the off-site energy.

SECTION RZ104
REFERENCED STANDARDS

RZ104.1 General. See Table RZ104.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE RZ104.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC 301	ANSI/RESNET/ICC 301-2022 Standard for the calculation and labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	RZ102, RZ103.4, RZ103.5

Section 4. The codifier of the Code of the City of Fort Collins is hereby directed to amend all existing cross references in the City Code and the Land Use Code in accordance with the provisions of this ordinance.

Section 5. The City Attorney and the City Clerk are hereby authorized to modify the formatting and to make such other amendments to this Ordinance as necessary to facilitate publication in the Fort Collins City Code; provided, however, that such modifications and amendments shall not change the substance of the Code provisions.

Introduced, considered favorably on first reading on December 2, 2025, and approved on second reading for final passage on December 16, 2025.

_____
Mayor

ATTEST:

_____
City Clerk

Effective Date: December 26, 2025
Approving Attorney: Madelene Shehan

Exhibit:
- Exhibit A - Notice of Publication
- Exhibit B - City of Fort Collins Building Code Residential Air Tightness Testing Protocol, New Attached and Detached Single Family Dwellings
- Exhibit C - City of Fort Collins New Multifamily Air Tightness Testing Protocol