File #: 250644, **Version:** 1

Amending Title 4 of The Philadelphia Code, entitled “The Philadelphia Building Construction and Occupancy Code,” by adopting the 2021 edition of the “International Energy Conservation Code” and the “International Residential Code- Part IV Energy Conservation” as published by the International Code Council, with previously adopted amendments thereto, as authorized by the Pennsylvania Uniform Construction Code Act, all under certain terms and conditions.

THE COUNCIL OF THE CITY OF PHILADELPHIA HEREBY ORDAINS:

SECTION 1. The contents of Subcode “EC” of Title 4 of The Philadelphia Code, entitled “The Philadelphia Energy Conservation Code,” are hereby deleted and replaced with the following:

SUBCODE "EC" (THE PHILADELPHIA ENERGY CONSERVATION CODE)

Article EC-1.0 Adoption of the "2021 International Energy Conservation Code," with local amendments.

§ EC-1.1 The "2021 International Energy Conservation Code," as published by the International Code Council, is hereby adopted as the Energy Conservation Code of the City of Philadelphia, with amendments as set forth in § EC-1.2.

§ EC-1.2 The "2021 International Energy Conservation Code," copies of which are on file with the Department of Licenses and Inspections, is incorporated as if fully set forth herein, subject to the following local amendments.

§ EC-1.2.1 The numbers of all local amendments shall be preceded with the prefix "EC-".

§ EC-1.2.2 Throughout the code, references to "International" codes or "ICC" codes shall be deemed to refer to the "Philadelphia" codes of the same name.

§ EC-1.2.3 Deletions of material are noted in [brackets].

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IECC-COMMERCIAL PROVISIONS

CHAPTER 1
SCOPE AND ADMINISTRATION

[Delete Section C101 and substitute the following:]

SECTION EC-C101 SCOPE AND GENERAL REQUIREMENTS

EC-C101.1 Title. These provisions shall be known as the Philadelphia Amendments to the International Energy Conservation Code (IECC) and will be referred to herein as the "Philadelphia Energy Conservation Code" or "this code".

EC-C101.2 Scope. The IECC Commercial Provisions of this code apply to commercial buildings and their sites, associated systems and equipment.

EC-C101.3 Intent. This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

EC-C101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive requirement shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

EC- C101.4.1 Mixed occupancy. Where a building includes both residential and commercial occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC-Commercial Provisions or IECC-Residential Provisions.

EC-C101.5 Compliance. Commercial buildings shall meet the provisions of the IECC - Commercial provisions. Residential buildings shall meet the provisions of IECC- Residential Provisions.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress, and their accessory structures, shall comply with the Philadelphia Residential Code (Subcode R).

EC-C101.5.1 Compliance materials. The code official may approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

EC-C101.6 Administrative provisions. This Chapter contains provisions that are unique to the administration of this code. Additional provisions applicable to the administration of this code are set forth in Subcode A (Administrative Code).

EC-C101.7 Appendices. No appendices are adopted as a part of this code.

[Delete Sections C103.3 through C103.5]

[Pursuant to the UCC, delete Section C105.2.6 and replace as follows:]

EC-C105.2.6 Final inspection. The building shall have a final inspection and not be occupied until approved.

[Delete Sections C107 through C110]

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CHAPTER 4
COMMERCIAL ENERGY EFFICIENCY

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[Pursuant to the UCC, delete Section C402.5.5 and replace as follows:]

EC-C402.5.5 Rooms containing fuel-burning appliances. In Climate Zones 3 through 8, where combustion air is supplied through openings in an exterior wall to a room or space containing a space-conditioning fuel-burning appliance, one of the following shall apply:

1. The room or space containing the appliance shall be located outside of the building thermal envelope.

2. The room or space containing the appliance shall be enclosed and isolated from conditioned spaces inside the building thermal envelope. Such rooms shall comply with all of the following:

2.1. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be insulated to be not less than equivalent to the insulation requirement of below-grade walls as specified in Table C402.1.3 or

2.2. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be sealed in accordance with Section C402.5.1.1.

2.3. The doors into the enclosed room or space shall be fully gasketed.

2.4. Water lines and ducts in the enclosed room or space shall be insulated in accordance with Section C403. 2.5. Where an air duct supplying combustion air to the enclosed room or space passes through conditioned space, the duct shall be insulated to an R-value of not less than R-8.

2.5. Where an air duct supplying combustion air to the enclosed room or space passes through conditioned space, the duct shall be insulated to an R-value of not less than R-8.

Exception:

1. *Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.*
2. *Fireplaces and stoves complying with Sections 901 through 905 of the International Mechanical Code, and Section 2111.14 of the International Building Code*

* * *

[Pursuant to the UCC, delete Section C405.11 and replace as follows:]

EC-C405.11 Automatic receptacle control. The following may have automatic receptacle control complying with Section EC-C405.11.1:

1. At least 50 percent of all 125V, 15- and 20-amp receptacles installed in enclosed offices, conference rooms, rooms used primarily for copy or print functions, breakrooms, classrooms and individual workstations, including those installed in modular partitions and module office workstation systems.

2. At least 25 percent of branch circuit feeders installed for modular furniture not shown on the construction documents.

EC-C405.11.1 Automatic receptacle control function. Automatic receptacle controls shall comply with the following:

1. Either split controlled receptacles shall be provided with the top receptacle controlled, or a controlled receptacle shall be located within 12 inches (304.8 mm) of each uncontrolled receptacle.

2. One of the following methods shall be used to provide control:

2.1. A scheduled basis using a time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. The control device shall be configured to provide an independent schedule for each portion of the building of not more than 5,000 square feet (464.5 m2) and not more than one floor. The occupant shall be able to manually override an area for not more than 2 hours. Any individual override switch shall control the receptacles of not more than 5,000 feet (1524 m).

2.2. An occupant sensor control that shall turn off receptacles within 120 minutes of all occupants leaving a space.

2.3. An automated signal from another control or alarm system that shall turn off receptacles within 120 minutes after determining that the area is unoccupied.

3. All controlled receptacles shall be permanently marked in accordance with NFPA 70 and be uniformly distributed throughout the space.

4. Plug-in devices shall not comply.

Exceptions: Automatic receptacle controls are not required for the following:

a. Receptacles specifically designated for equipment requiring continuous operation (24 hours per day, 365 days per year).

b. Spaces where an automatic control would endanger the safety or security of the room or building occupants.

c. Within a single modular office workstation, noncontrolled receptacles are permitted to be located more than 12 inches (304.8 mm), but not more than 72 inches (1828 mm) from the controlled receptacles serving that workstation.

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IECC-RESIDENTIAL PROVISIONS

The text of the 2021 IECC-R parallels the text of the 2021 IRC, Part IV- Energy Conservation. The section numbers appearing in parentheses after each section number are the section numbers of the corresponding text in the IRC, Part IV. If a section does not have a section number in parentheses after it, then there is no corresponding text in the 2021 IRC, Part IV.

* * *

CHAPTER 1
SCOPE AND ADMINISTRATION

[Delete Section R101 and substitute the following:]

SECTION EC-R101 SCOPE AND GENERAL REQUIREMENTS

EC-R101.1 Title. These provisions shall be known as the Philadelphia Amendments to the International Energy Conservation Code (IECC) and will be referred to herein as the "Philadelphia Energy Conservation Code" or "this code".

EC-R101.2 Scope. The IECC Residential Provisions of this code apply to residential buildings and their sites, associated systems and equipment.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress and their accessory structures shall comply with the Philadelphia Residential Code (Subcode R).

EC-R101.3 Intent. This code shall regulate the design and construction of buildings for the effective use and conservation of energy over the useful life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

EC-R101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive requirement shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

EC- R101.4.1 Mixed occupancy. Where a building includes both residential and commercial occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC-Commercial Provisions or IECC-Residential Provisions.

EC-R101.5 Compliance. Residential buildings shall meet the provisions of IECC- Residential Provisions. Commercial buildings shall meet the provisions of the IECC - Commercial provisions.

Exception: Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories high with separate means of egress, and their accessory structures, shall comply with the Philadelphia Residential Code (Subcode R).

EC-R101.5.1 Compliance materials. The code official may approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

EC-R101.6 Administrative provisions. This Chapter contains those provisions that are unique to the administration of this code. Additional provisions applicable to the administration of this code are set forth in Subcode A (Administrative Code).

EC-R101.7 Appendices. No appendices are adopted as a part of this code.

[Delete Sections R103.3 through R103.5]

[Delete Section R104]

[Delete Sections R106 through R109]

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CHAPTER 2
DEFINITIONS 200

Pursuant to the UCC:
Framing Factor. The fraction of the total building component area that is structural framing.

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CHAPTER 4
RESIDENTIAL ENERGY EFFICIENCY

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[Pursuant to the UCC, delete Table R402.1.2 and replace as follows:]

TABLE EC-R402.1.2 (N1102.1.2)
MAXIMUM ASSEMBLY U-FACTORS[a] AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[d,e]	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	0.50	0.75	0.25	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.25	0.030	0.084	0.165	0.064	0.360	0.477
3	0.32	0.55	0.25	0.030	0.060	0.098	0.047	0.091	0.136
4 except Marine	0.32	0.55	0.40	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.55	NR	0.026	0.051	0.082	0.033	0.050	0.055
6	0.30	0.55	NR	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.30	0.55	NR	0.026	0.045	0.057	0.028	0.050	0.055

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 0.17 in Climate Zone 1, 0.14 in Climate Zone 2, 0.12 in Climate Zone 3, 0.087 in Climate Zone 4 except Marine, 0.065 in Climate Zone 5 and Marine 4, and 0.057 in Climate Zones 6 through 8.

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.
Exception: In Climate Zones 0 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

e. There are no SHGC requirements in the Marine Zone.

f. A maximum U-factor of 0.32 shall apply in Marine Climate Zone 4 and Climate Zones 5 through 8 to vertical fenestration products installed in buildings located either:

1. Above 4,000 feet in elevation above sea level, or

2. In windborne debris regions where protection of openings is required by Section R301.2.1.2. of the International Residential Code.

* * *

[Pursuant to the UCC, delete Table R402.1.3 and replace as follows:]

TABLE R402.1.3 (N1102.1.3)
INSULATION MINIMUM R-VALUE AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-FACTOR	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R-VALUE	BASEMENT[c] WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	CRAWL SPACE[c] WALL R-Value
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.32	0.55	0.25	38	20 or 13 + 5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.32	0.55	0.40	49	20 or 13 + 5[h]	8/13	19	10/13	10, 2ft	10/13

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5 and Marine 4	*0.30*	*0.55*	*NR*	*49*	*23 or 13 + 7.5[h] or 20 + 3.8[h]*	*13/17*	*30[g]*	*15/19*	*10, 4ft or 15, 3ft*	*15/19*
6	*0.30*	*0.55*	*NR*	*49*	*20 + 5[h] or 13 + 10[h]*	*15/20*	*30[g]*	*15/19*	*10, 4 ft*	*15/19*
7 and 8	*0.30*	*0.55*	*NR*	*49*	*20 + 5[h] or 13 + 10[h]*	*19/21*	*38[g]*	*15/19*	*10, 4 ft*	*15/19*

For SI: 1 foot = 304.8 mm. NR = Not Required.

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.
Exception: In Climate Zones 1 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

c. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R -19 cavity insulation on the interior of the basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

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. as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation shall not be required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Alternatively, insulation sufficient to fill the framing cavity providing not less than an R-value of R-19.

h. 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.

i. 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.

** * *[Pursuant to the UCC, delete Section R403.3.7and replace as follows:]*

EC-R403.3.7 (N1103.3.7) Building cavities (Mandatory). Building framing cavities shall not be used as supply ducts.

* * *

[Pursuant to the UCC, delete Section R403.5.1.1 and replace as follows:]

EC-R403.5.1.1 (N1103.5.1.1) Circulation systems. Heated water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermosyphon circulation systems shall be prohibited. Controls for circulating hot water system pumps shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water. The controls shall limit the temperature of the water entering the cold water piping to no greater than 104ºF (40ºC).

Exception: Where the entire hot water piping system (both supply and return) are insulated with a minimum R3 insulation, the stated controls are not required

EC-R403.5.1.1.1 Demand recirculation water systems.

Where installed, demand recirculation water systems shall have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.

EC-R403.5.1.2 Heat trace systems.
Electric heat trace systems shall comply with IEEE 515.1 or UL 515. Controls for such systems shall automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy.

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[Pursuant to the UCC, delete Section R404.1.2 (N1104.1.2)]

* * *

[Pursuant to the UCC, delete Section R405.3.2 and replace as follows:]

EC-R405.3.2 (N1105.3.2) Compliance report. Compliance software tools shall generate a report that documents that the proposed design complies with Section R405.4 (N1105.4). A compliance report on the proposed design shall be submitted with the application for the building permit. Upon completion of the building, a compliance report based on the as-built condition of the building shall be submitted to the code official before a certificate of occupancy is issued. Batch sampling of buildings to determine energy code compliance for all buildings in the batch shall be prohibited.

Compliance reports shall include information in accordance with Sections R405.43.2.1 (N1105.43.2.1) and R405.43.2.2 (N1105.43.2.2). Where the proposed design of a building could be built on different sites where the cardinal orientation of the building on each site is different, compliance of the proposed design for the purposes of the application for the building permit shall be based on the worst-case orientation, worst-case configuration, worst-case building air leakage and worst-case duct leakage. Such worst-case parameters shall be used as inputs to the compliance software for energy analysis.

EC-R405.3.2.1 (N1105.3.2.1) Compliance report for permit application. A compliance report submitted with the application for building permit shall include the following:
1. Building street address, or other building site identification.
2. A statement indicating that the proposed design complies with Section R405.2 (N1105.2).
3. An inspection checklist documenting the building component characteristics of the proposed design as indicated in Table R405.4.2(1) (N1105.4.2(1)). The inspection checklist shall show results for both the standard reference design and the proposed design with user inputs to the compliance software to generate the results.
4. A site-specific energy analysis report that is in compliance with Section R405.2 (N1105.2).
5. The name of the individual performing the analysis and generating the report.
6. The name and version of the compliance software tool.

EC-R405.3.2.2 (N1105.3.2.2) Compliance report for certificate of occupancy. A compliance report submitted in order to obtain the certificate of occupancy shall include the following:
1. Building street address, or other building site identification.
2. Declaration of the total building performance path on the title page of the energy report.
3. A statement bearing the name of the individual performing the analysis and generating the report, indicating that the as-built building complies with Section R405.2 (N1105.2).
4. The name and version of the compliance software tool.
5. A site-specific energy analysis report that is in compliance with Section R405.2 (N1105.2).
6. A final confirmed certificate indicating compliance based on inspection, and a statement indicating that the confirmed rated design of the built home complies with Section R405.2 (N1105.2). The certificate shall report the energy features that were confirmed to be in the home, including component-level insulation R-values or U-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation and service water heating equipment installed.
7. Where on-site renewable energy systems have been installed, the certificate shall report the type and production size of the installed system.

* * *

[Pursuant to the UCC, delete Table R405.4.2 (1) (N1105.4.2(1)) and replace as follows:]

TABLE EC- R405.4.2(1) (N1105.4.2(1)) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS		
BUILDING COMPONENT	*STANDARD REFERENCE DESIGN*	*PROPOSED DESIGN*
Above-grade walls	*Type: mass where the proposed wall i a mass wall otherwise wood frame.*	*As proposed*
	Gross area: same as proposed	*As proposed*
	U-factor: as specified in TABLE R402.1.2	*As proposed*
	Solar absorptance= 0.75.	*As proposed*
	Emittance= 0.90.	*As proposed*
Basement and crawl space walls	*Type: same as proposed.*	*As proposed*
	Gross area: same as proposed.	*As proposed*
	U-factor: as specified in TABLE R402.1.2, with the insulation layer on the interior side of walls.	*As proposed*
Above-grade floors	*Type: Wood frame.*	*As proposed*
	Gross area: same as proposed.	*As proposed*
	U-factor: as specified in TABLE R402.1.2	*As proposed*
Ceilings	*Type: wood frame.*	*As proposed*
	Gross area: same as proposed	*As proposed*

	U-factor: as specified in TABLE R402.1.2	*As proposed*
Roofs	*Type: compositions shingle on wood sheathing.*	*As proposed*
	Gross area: same as proposed	*As proposed*
	Solar absorptance= 0.75.	*As proposed*
	Emittance= 0.90.	*As proposed*
Attics	*Type: vented with an aperture of 1 ft^2 per 300 ft^2 of ceiling area.*	*As proposed*
Foundations	*Type: same as proposed*	*As proposed*
	Foundation wall area above and belov grade and soil characteristics: same a proposed.	*As proposed*
Opaque doors	*A=40ft^2.*	*As proposed*
	Orientation: North	*As proposed*
	U-factor: same as fenestration as specified in TABLE R402.1.2	*As proposed*
Vertical fenestration other than opaque doors	*Total area[h] = a. The proposed glazing area, where the proposed glazing area is less than 15 percent of the conditioned floor area. b. 15 percent of the conditioned floor area, where th proposed glazing area is 15 percent o more of the conditioned floor area.*	*As proposed*
	Orientation: equally distributed to fou cardinal compass orientations (N,E,S& W)	*As proposed*
	U-factor: as specified in TABLE R402.1.2	*As proposed*
	SHGC: as specified in Table N1102.1. except for climate zones without an SHGC requirement, the SHGC shall b equal to 0.40.	*As proposed*
	Interior shade fraction: 0.9-(0.21 x SHGC for the standard reference design).	*Interior shade fraction 0.92-(0.21 x SHGC as proposed)*
	External shading: none	*As proposed*
Skylights	*None*	*As proposed*
Thermally isolated sunrooms	*None*	*As proposed*

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Air exchange rate	*The air leakage rate at a pressure of 0.2 inch w.g. (50 Pa) shall be Climate Zones 1 and 2: 5 air change per hour. Climate Zones 3 through 8: 3 air changes per hour. The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but greater than 0.01 x CFA + 7.5 x (N_{br} + 1) Where: CFA = conditioned floor area, ft^2. N_{br} = number of bedrooms. Energy recovery shall not be assumed for mechanical ventilation.*	*The measured air exchange rate[2]. T mechanical ventilation rate[b] shall be i addition to the air leakage rate and sh be as proposed.*
Mechanical ventilation	*Where mechanical ventilation is not specified in the proposed design: Non Where mechanical ventilation is specified in the proposed design, the annual vent fan energy use, in units of kWh/yr, shall equal (l/e_p) x [0.0876 x CFA + 65.7 x (N_{br} +1)] Where: e_f = the minimum exhaust fan efficacy, a specified in Table R403.6.1, corresponding to a flow rate of 0.01 x CFA+7.5x(N_{br}+1) CFA=conditioned floor area, ft^2. N_{br} = number of bedrooms.*	*As proposed*
Internal gains	*Gain, in units of BTU/day per dwelling unit, shall equal 17.900 + 23.8 x CFA + 4,104 x N_{br} where: CFA= conditioned floor area, ft^2. N_{br} = number of bedrooms.*	*Same as standard reference design.*
Internal mass	*Internal mass for furniture and contents: 8 pounds per square feet of floor area.*	*Same as standard reference design, pl any additional mass specifically desig as a thermal storage element[c] but not integral to the building envelope or structure.*
Structural mass	*For masonry floor slabs: 80 percent o floor area covered by R-2 carpet and pad, and 20 percent of floor directly exposed to room area.*	*As proposed*
	For masonry basement walls, as proposed, but with insulation as specified in Table R402.1.3 located on the interior side of the walls.	*As proposed*
	For other walls, ceilings, floors, and interior walls: wood frame construction	*As proposed*

Heating systems [d,e]	*For other than electric heating without a heat pump: as proposed. Where the proposed design utilizes electric heating without a heat pump, the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC - Commercial provisions. Capacity: sized in accordance with Section N1103.7.*	*As proposed*
Cooling systems [d,f]	*As proposed. Capacity: sized in accordance: with Section N1103.7.*	*As proposed*
Service water heating[d,e,f,g]	*As proposed. Use: same as proposed design.*	*As proposed Use, in units of gal/day 30 + (10xN_{br}) where: N_{br} = number o bedrooms*

* * *

Thermal distribution systems	*Duct insulation: in accordance with Section N1103.3.1. A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. Exception: For non-ducted heating and cooling systems that do not have a fan, the standard reference design thermal distribution system efficiency (DSE) shall be 1. For tested duct systems, the leakage rate shall be 4 cfm per 100 sf of conditioned floor area at a pressure differential of 0.1-inch w.g. (25 Pa).*	*Duct insulation: as proposed.. As tested or, where not tested, as specified in Table R405.4.2(2).*
Thermostat	*Type: Manual, cooling temperature setpoint = 75-degrees F Heating temperature setpoint = 72-degrees F*	*Same as standard reference design.*

For SI: 1 square foot = 0.93 m^2, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m^2, 1 gallon (US) = 3.785 L, °C = (°F-32)/1.8, 1 degree = 0.79 rad.

a. Where required by the code official, testing shall be conducted by an approved party. Hourly calculations as specified in the ASHRAE Handbook of Fundamentals, or the equivalent, shall be used to determine the energy loads resulting from infiltration.

b. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE Handbook of Fundamentals, page 26.24 and the "Whole -house Ventilation" provisions of 2001 ASHRAE Handbook of Fundamentals, page 26.19 for intermittent mechanical ventilation.

c. Thermal storage element shall mean a component that is not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element shall be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or shall be connected to such a room with pipes or ducts that allow the element to be actively charged.

d. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

e. For a proposed design without a proposed heating system, a heating system having the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design.

f. For a proposed design home without a proposed cooling system, an electric air conditioner having the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

g. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater having the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For a proposed design without a proposed water heater, a 40-gallon storage-type water heater having the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

h. For residences with conditioned basements, R-2 and R-4 residences, and for townhouses, the following formula shall be used to determine glazing area:

$AF = A_s * FA * F$

where:
AF = Total glazing area.
A_s *= Standard reference design total glazing area.*
FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).
F = (above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

And where:
Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.
Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.
Common wall area is the area of walls shared with an adjoining dwelling unit. L and CFA are in the same units.

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[Pursuant to the UCC, delete Section R406.3 (N1106.3) and replace with 'Reserved'.]

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[Pursuant to the UCC, delete Section R-406.4 and replace as follows:]

EC-R406.4 (N1106.4) Energy rating index. The Energy Rating Index (ERI) shall be a numerical integer value that is based on a linear scale constructed such that the ERI reference design has an Index value of 100 and a residential building that uses no net purchased energy has an Index value of 0. Each integer value on the scale shall represent a 1 percent change in the total energy use of the rated design relative to the total energy use of the ERI reference design. The ERI shall consider all energy used in the residential building.

EC-R406.4.1 (N1106.4.1) ERI reference design. The ERI reference design shall be configured such that it meets the minimum requirements of the 2006 International Energy Conservation Code prescriptive requirements. The proposed residential building shall be shown to have an annual total normalized modified load less than or equal to the annual total loads of the ERI reference design.

* * *

[Pursuant to the UCC, delete Section R406.7.1 and replace as follows:]

EC-R406.7.1 (N1106.7.1) Compliance software tools. Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the code official.

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[Pursuant to the UCC, delete Section R406.7.2 and replace as follows:]

EC- R406.7.2 (N1106.7.2) Compliance report. Compliance software tools shall generate a report that documents that the home and the ERI score of the rated design complies with Sections R406.2, R406.3 and R406.4. Compliance documentation shall be created for the proposed design and shall be submitted with the application for the building permit. Confirmed compliance documents of the built dwelling shall be created and submitted to the code official for review before a certificate is issued. Compliance reports shall include information in accordance with Sections R406.7.2.1 and R406.7.2.2.

EC-R406.7.2.1 (N1106.7.2.1) Proposed compliance report for permit application. Compliance reports submitted with the application for a building permit shall include the following:

1. Building Street address or other building site identification

2. Declare ERI on title page and building plans.
3. The name of the individual performing the analysis and generating the compliance 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 reference design and/or the rated home.
6. A certificate indicating that the proposed design has an ERI less than or equal to the appropriate score indicated in Table R406.5 when compared to the ERI reference design. The certificate shall document the building component energy specifications that are included in the calculation, including: component level insulation R-values or U-factors; assumed duct and building envelope air leakage testing results; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation, and service water-hating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.
7. When a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated home.

R406.7.2.2 (N1106.7.2.2) 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:
1. Building street address or other building site identification
2. Declaration of ERI on title page and on building plans
3. The name of the individual performing the analysis and generating the compliance 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 reference design and/or the rated home.
6. A final confirmed certificate indicating that the confirmed rated design of the built home complies with Sections R406.2 (N1106.2) and R406.4 (N1106.4). The certificate shall report the energy features that were confirmed to be in the home, including: component-level insulation R-values or U-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating cooling, mechanical ventilation, and service water-heating equipment installed. Where on-site renewable energy systems have been installed on or in the home, the certificate shall report the type and production size of the installed home.

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Pursuant to the UCC, delete Section R406.7.5 and R406.7.6:

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Pursuant to the UCC, add Section R406.8 as follows:

EC-R406.8 (N1106.8) Calculation software tools. Calculation software, where used, shall be in accordance with Sections R406.8.1 (N1106.8.1) through R406.8.3 (N1106.8.3).

EC-406.8.1(N1106.8.1) Minimum capabilities. Calculation procedures used to comply with this section shall be software tools capable of calculating the ERI as described in Section R406.4 (N1106.4), and shall include the following capabilities:

1. *Computer generation of the ERI reference design using only the input for the rated design. The calculation shall not allow the user to directly modify the building component characteristics of the ERI reference design.*
2. *Calculation of the whole-building, as a single zone, sizing for the heating and cooling equipment in the ERI reference design residence in accordance with Section R403.7 (N1103.7)*
3. *Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilation, and air-conditioning equipment based on climate and equipment sizing.*
4. *Printed code official inspection checklist listing each of the rated design component characteristics determined by the analysis to provide compliance, along with their respective performance ratings.*

EC-R406.8.2 (N1106.8.2) Specific Approval. Performance analysis tools meeting the applicable sections of Section R406 (N1106) shall be approved. Tools are permitted to be approved based on meeting a specified threshold for a jurisdiction. The code official shall approve tools for a specified application or limited scope.

EC- R406.8.3 (N1106.8.3) Input values. Where calculations require input values not specified by Section R402 (N1102), R403 (N1103), R404 (N1104), and R405 (N1105), those input values shall be taken from an approved source.