

ARTICLE 12. ENERGY CODE.

§ 25-12-261 INTERNATIONAL ENERGY CONSERVATION CODE.

- (A) The International Energy Conservation Code, ~~2021~~ 2024 Edition, published by the International Code Council ("~~2021~~ 2024 International Energy Conservation Code") ~~and Appendices RE, RF, RJ, and RK, is~~ are adopted and incorporated by reference into this section with the deletions and amendments in Subsections (B), (C), and (D) and Section 25-12-263 (*Local Amendments to the International Energy Conservation Code*).
- (B) The following commercial provisions of the ~~2021~~ 2024 International Energy Conservation Code are deleted. A subsection contained within a deleted section or subsection is not deleted, unless specifically listed below:

C402.3	C402.4.3	C405.2
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- (D) The following residential provisions of the ~~2021~~ 2024 International Energy Conservation Code are deleted. A subsection contained within a deleted section or subsection is not deleted, unless specifically listed below:

R202 definition of "Residential Building"	R402.5	R405.2
R402.1.2	R402.6	Table R405.2
Table R402.1.2	R403.3.5	Table R405.4.2(1)
R402.1.3	R403.3.7	Table R406.2
Table R402.1.3	R403.3.6	Table R406.5
R402.3	R403.3.8	R503.1.1.1
R402.4.4	Table R403.3.8	RJ101.1
R402.4.1.2 R402.5.1.2	R403.3.9	RK101.1
R402.5.1.2.1	R403.6.3	
R402.5.1.3	R403.9	

§ 25-12-262 CITATIONS TO THE ENERGY CODE.

In the City Code, "Energy Code" means the ~~2021~~ 2024 International Energy Conservation Code adopted by Section 25-12-261 (*International Energy Conservation Code*) and as amended by Section 25-12-263 (*Local Amendments to the International Energy Conservation Code*). In this article, "this code" means the Energy Code.

Commented [A1]: Updated code reference from 2021 to 2024.

Commented [A2]: Local amendments recommend inclusion of Appendix RE, RF, and RK. RF is referenced by section R405.4.2 and includes U-factors for alternative wall assemblies that may be easier to use by users.

Commented [A3]: Updated numbering in table due to model code changes. Deleted amendments no longer needed.

Commented [A4]: Updated code reference from 2021 to 2024.

§ 25-12-263 LOCAL AMENDMENTS TO THE INTERNATIONAL ENERGY CONSERVATION CODE.

(C) The following provisions are local amendments to the residential provisions to the ~~2021~~ 2024 International Energy Conservation Code. Each provision in this subsection is a substitute for an identically numbered provision deleted by Section 25-12-261(D) or an addition to the Energy Code.

Commented [A5]: Updated code reference from 2021 to 2024.

R101.2 Scope. This code applies to the design and construction of detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and Group R-2, R-3 and R-4 buildings three four stories or less in height above grade plane.

Commented [A6]: Updated to align number of stories with R202 General Definitions. Residential Buildings.

R201.3 Terms defined in other codes. Terms not defined in this code that are defined in the Building Code, Electrical Code, Fire Code, Mechanical Code, the Plumbing Code, Residential Code, and Chapter 25-12, Article 3 (Flood Hazard Areas) have the meaning ascribed to them as in those codes.

R202 General Definitions. Residential Building. For this code, includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as Group R-2, R-3 and R-4 buildings four stories or less in height above grade plane.

R302.2 Exterior Design Conditions. The design parameters in Table 302.2 shall be used for calculations under this code.

TABLE R302.2 EXTERIOR DESIGN CONDITIONS

CONDITION	VALUE
Winter ^a , Design Dry-bulb (°F)	30
Summer ^a , Design Dry-bulb (°F)	100
Summer ^a , Design Wet-bulb (°F)	74
Climate Zone	2A
For SI: deg C=[(°F)-32]/1.8	
^a Adjustments shall be permitted to reflect local climates, which differ from the tabulated temperatures, or local weather experience determined by the building official.	

R402.1.2 Insulation and fenestration criteria. The *building thermal envelope* shall meet the requirements of Table R402.1.2(1) for *existing buildings* and Table R402.1.2(2) for new construction. Assemblies shall have a U-factor or F-factor equal to or less than that specified in Table R402.1.2(1) for *existing buildings* and Table R402.1.2(2) for new construction. *Fenestration* shall have a U-factor and glazed fenestration SHGC equal to or less than that specified in Table R402.1.2(1) for *existing buildings* and Table R402.1.2(2) for new construction.

Commented [A7]: Updated to match model code update to include F-factors for slab foundations.

TABLE R402.1.2(1) MAXIMUM ASSEMBLY U-FACTORS^{a,b} AND FENESTRATION REQUIREMENTS FOR EXISTING BUILDINGS

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC ^d	CEILING U-FACTOR	ATTIC ROOFLINE U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^e	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR

Commented [A8]: 2024 IECC model code updated table format from horizontal to vertical.

2	0.40	0.60	0.25	0.026	0.045	0.075	0.165	0.064	0.36	0.477
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^aThe values in this table apply to additions having an area no more than 40% of the existing construction.
^bNon-fenestration U-factors shall be obtained from measurement, calculation or an approved source.
^cMass 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 0.14 in Climate Zone 2.
^dThe SHGC row applies to all glazed fenestration.

Exception: In Climate Zone 2, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

CLIMATE ZONE	2
VERTICAL FENESTRATION U-FACTOR	0.40
SKYLIGHT U-FACTOR	0.60
GLAZED VERTICAL FENESTRATION SHGC	0.25
SKYLIGHT SHGC	0.28
CEILING U-FACTOR	0.026 0.030
ATTIC ROOFLINE U-FACTOR	0.045
WOOD FRAME WALL U-FACTOR	0.075
MASS WALL U-FACTOR ^c	0.165
FLOOR U-FACTOR	0.064
BASEMENT WALL U-FACTOR ^d	0.360
UNHEATED SLAB F-FACTOR ^e	0.73
HEATED SLAB F-FACTOR ^e	0.74
CRAWL SPACE U-FACTOR	0.477

For SI: 1 foot = 304.8 mm.

^aThe values in this table apply to additions having an area no more than 40% of the existing construction.
^bNon-fenestration U-factors and F-factors shall be obtained from measurement, calculation or an approved source.
^cMass walls shall be in accordance with Section R402.2.6. Where more than half the insulation is on the interior, the mass wall U-factors shall not exceed 0.14 in Climate Zone 2.
^dIn Warm Humid locations as defined by Figure R301.1 and Table R301.1, the basement wall U-factor shall not exceed 0.360.
^eF-factors for slabs correspond to the R-values of Table R402.1.3(1) and the installation conditions of Section R402.2.10.1.

Commented [A9]: 2024 IECC model code amended Ceiling U-factor to reflect associated change in R-value from R49 to R38. Local amendment made to mirror that change.

Commented [A10]: 2024 IECC model code added additional assembly requirement for "Insulation Entirely Above Roof Deck." Local amendment already exists for this assembly in "Attic Roofline" insulation, which includes above and below deck insulation R-value. No change is recommended for the existing local amendment for the U-factor to allow for above and below deck differences.

TABLE R402.1.2(2) MAXIMUM ASSEMBLY U-FACTORS AND FENESTRATION REQUIREMENTS FOR NEW CONSTRUCTION^a

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC ^d	CEILING U-FACTOR	ATTIC ROOFLINE U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
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Commented [A11]: 2024 IECC model code updated table format from horizontal to vertical.

Commented [A12]: Table name updated to align with model code.

						FACT OR				FACT OR
2	0.35	0.60	0.25	0.02 6	0.045	0.06 6	0.165	0.06 4	0.36	0.47 7
<p>^aNon-fenestration U-factors shall be obtained from measurement, calculation or an approved source.</p> <p>^bMass 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 0.14 in Climate Zone 2.</p> <p>^cThe SHGC row applies to all glazed fenestration.</p>										

Exception: In Climate Zone 2, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

CLIMATE ZONE	2
VERTICAL FENESTRATION U-FACTOR	0.35
SKYLIGHT U-FACTOR	0.60
GLAZED VERTICAL FENESTRATION SHGC	0.25
SKYLIGHT SHGC	0.28
CEILING U-FACTOR	0.026 0.030
ATTIC ROOFLINE U-FACTOR	0.045
WOOD FRAME WALL U-FACTOR^b	0.066
MASS WALL U-FACTOR	0.165
FLOOR U-FACTOR	0.064
BASEMENT WALL U-FACTOR^c	0.360
UNHEATED SLAB F-FACTOR^d	0.73
HEATED SLAB F-FACTOR^d	0.74
CRAWL SPACE U-FACTOR	0.477
For SI: 1 foot = 304.8 mm.	
^a Non-fenestration U-factors and F-factors shall be obtained from measurement, calculation, or an approved source or Appendix RF where such appendix is adopted or approved.	
^b Mass walls shall be in accordance with Section R402.2.6. Where more than half the insulation is on the interior, the mass wall U-factors shall not exceed 0.14 in Climate Zone 2.	
^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 F-factors for slabs correspond to the R-values of Table R402.1.3(2) and the installation conditions of Section R402.2.10.1.	

Commented [A13]: 2024 IECC model code amended Ceiling U-factor to reflect associated change in R-value from R49 to R38. Local amendment made to mirror that change.

Commented [A14]: 2024 IECC model code added additional assembly requirement for "Insulation Entirely Above Roof Deck." Local amendment already exists for this assembly in "Attic Roofline" insulation, which includes above and below deck insulation R-value. No change is recommended for the existing local amendment for the U-factor to allow for above and below deck differences.

R402.1.3 R-value alternative. Assemblies with R-value of insulation materials equal to or greater than that specified in Table R402.1.3(1) for existing buildings and Table R402.1.3(2) for new construction shall be an alternative to the U-factor or F-factor in Table R402.1.2(1) for existing buildings and Table R402.1.2(2) for new construction, respectively.

Commented [A15]: Updated to match model code update to include F-factors for slab foundations.

TABLE R402.1.3(1) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT^{a,b} FOR EXISTING BUILDINGS

Commented [A16]: 2024 IECC model code updated table format from horizontal to vertical.

CLIMATE ZONE	FENESTRATION U-FACTOR ^a	SKYLIGHT U-FACTOR ^a	GLAZED FENESTRATION RATIO SHGC ^a	CEILING R-VALUE ^{a,b}	ATTIC ROOFLINE R-VALUE ^{a,b}	WOOD FRAME WALL R-VALUE ^a	MASS WALL R-FACTOR ^b	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB R-VALUE & DEPTH	CRAWL SPACE WALL U-FACTOR
2	0.40	0.60	0.25	49	25&0ci or 0&20ci	15, 13&2ci, or 0&10ci	4/6	13	0	0	0

^aThe values in this table apply to *repairs, renovations, or additions* that increase the conditioned floor area by no more than 40 percent. All other construction shall use the values for new construction in Table R402.1.3(2).

^bR-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.

^cThe fenestration U-factor row excludes skylights. The SHGC row applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 2 where the SHGC for such skylights does not exceed 0.30.

^dAir impermeable insulation of R-25&0 or greater may be used if mechanical equipment and air distribution system are located entirely within the building thermal envelope. "Air impermeable" shall be defined as having an air permeance not exceeding 0.02 L/s·m² at 75 Pa pressure differential tested according to ASTM E 2178 or ASTM E 283.

^eFirst value is *cavity insulation*, the second value is *continuous insulation (ci)* or *insulated siding*. Therefore, as an example, "13&2ci" means R-13 *cavity insulation* plus R-2 *continuous insulation* or *insulated siding*. Where R-13&2ci is used, non-insulated structural sheathing shall cover no more than 25% of the exterior.

^fTotal fill cavity insulation will be deemed as meeting the R-15 requirement.

^gR-0&20ci *continuous insulation* can be used where the insulation is completely above the roof framing and sub-roofing.

^hMass 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.

CLIMATE ZONE	2
VERTICAL FENESTRATION U-FACTOR	0.40
SKYLIGHT U-FACTOR	0.60
GLAZED VERTICAL FENESTRATION SHGC	0.25
SKYLIGHT SHGC	0.28
CEILING R-VALUE	49 38
ATTIC ROOFLINE R-VALUE ^{c,d,g,h,i}	25&0ci or 0%20ci 0&25ci
WOOD FRAME WALL R-VALUE ^{c,d,e}	15, 13&2ci, or 0&10ci
MASS WALL R-VALUE ⁱ	4/6
FLOOR R-VALUE ^{c,d}	13 OR 7&5ci or 0&10ci
BASEMENT WALL R-VALUE ^f	0
UNHEATED SLAB R-VALUE & DEPTH ^e	0
HEATED SLAB R-VALUE & DEPTH ^{c,d,e}	R-5ci edge and R-5 full slab
CRAWL SPACE WALL R-VALUE ^{c,d}	0
For SI: 1 foot = 304.8 mm NR = Not Required. ci = continuous insulation.	
^a The values in this table apply to <i>repairs, renovations, or additions</i> that increase the conditioned floor area by no more than 40 percent. All other construction shall use the values for new construction in Table R402.1.3(2) .	
^b R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.	
^c "5ci or 13" means R-5 <i>continuous insulation (ci)</i> on the interior or exterior surface of the wall or R-13 <i>cavity insulation</i> on the interior side of the wall. "10ci or 13" means R-10 <i>continuous insulation (ci)</i> on the interior or exterior surface of the wall or R-13 <i>cavity insulation</i> on the interior side of the wall. "15ci or 19 or 13&5ci" means R-15 <i>continuous insulation (ci)</i>	

Commented [A17]: 2024 IECC model code amended R-value from R49 to R38. Local amendment made to mirror that change.

Commented [A18]: 2024 IECC model code added additional assembly requirement for "Insulation Entirely Above Roof Deck." Local amendment already exists for this assembly in "Attic Roofline" insulation, which includes above and below deck insulation R-value. Local amendment made to mirror change in above deck R-value.

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.
^dThe first value is cavity insulation, the second value is continuous insulation (ci) or insulated siding. Therefore, as an example, "13&2ci" means R-13 cavity insulation plus R-2 continuous insulation or insulated siding. Where R-13&2ci is used, non-insulated structural sheathing shall cover no more than 25% of the exterior.
^eSlab insulation shall be installed in accordance with Section R402.2.10.1.
^fBasement wall insulation is not required in Warm Humid locations as defined by Figure R301.1 and Table R301.1.
^gTotal fill cavity insulation will be deemed as meeting the R-15 requirement.
^hAir-impermeable insulation of R-25&0 or greater may be used if mechanical equipment and air distribution system are located entirely within the building thermal envelope. "Air-impermeable" shall be defined as having an air permeance not exceeding 0.02 L/s-m² at 75 Pa pressure differential tested according to ASTM E 2178 or ASTM E 283.
ⁱR-0&25ci continuous insulation can be used where the insulation is completely above the roof framing and sub-roofing.
^jMass walls shall be in accordance with Section R402.2.6. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

Commented [A19]: Local amendment deleted as no longer needed.

TABLE R402.1.3(2) INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT^a FOR NEW CONSTRUCTION

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT U-FACTOR ^b	GLAZED FENESTRATION SHGC ^c	CEILING G-R-VALUE ^{d,e}	ATTIC ROOFLINE R-VALUE ^{d,g}	WOOD FRAME WALL R-VALUE ^{d,f}	MASS WALL R-VALUE ^h	FLOOR R-VALUE	BASEMENT WALL R-VALUE	SLAB R-VALUE & DEPTH ^e	CRAWL SPACE WALL R-VALUE
2	0.35	0.60	0.25	49	25&0ci or 0&20ci	19, 15&2ci ; 13&3ci ; or 0&15ci	4/6	13	0	0	0

Commented [A20]: 2024 IECC model code updated table format from horizontal to vertical.

^aR-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
^bThe fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zone 2 where the SHGC for such skylights does not exceed 0.30.
^cR-5 insulation shall be provided under the full slab area of a heated slabs 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.
^dAir-impermeable insulation of R-25 or greater may be used if mechanical equipment and air distribution system are located entirely within the building thermal envelope. "Air-impermeable" shall be defined as having an air permeance not exceeding 0.02 L/s-m² at 75 Pa pressure differential tested according to ASTM E 2178 or ASTM E 283.
^eFirst value is cavity insulation, the second value is continuous insulation (ci) or insulated siding, so "13&5ci" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding and "10ci" means R-10 continuous insulation. Where R-15&2ci or R-13&3ci is used, non-insulated structural sheathing shall cover no more than 25% of the exterior.
^fTotal fill cavity insulation in a 2x4 wall will be deemed as meeting the R-15 requirement.
^gR-0&20ci continuous insulation can be used where the insulation is completely above the roof framing and sub-roofing.
^hMass 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.

CLIMATE ZONE	2
VERTICAL FENESTRATION U-FACTOR	0.35
SKYLIGHT U-FACTOR	0.60
GLAZED VERTICAL FENESTRATION SHGC	0.25

SKYLIGHT SHGC	0.28
CEILING R-VALUE	49 38
ATTIC ROOFLINE R-VALUE ^{b,c,f,g,h}	25&0ci or 0%20ci 0&25ci
WOOD FRAME WALL R-VALUE ^{b,c,f}	19, 15&2ci, 13&3ci, or 0&15ci
MASS WALL R-VALUE ^{h+}	4/6
FLOOR R-VALUE ^{b,c}	13 OR 7&5ci OR 0&10ci
BASEMENT WALL R-VALUE ^{b,e}	0
UNHEATED SLAB R-VALUE & DEPTH ^d	0
HEATED SLAB R-VALUE & DEPTH ^{b,c,d}	R-5ci edge and R-5 full slab
CRAWL SPACE WALL R-VALUE ^{b,c}	0

For SI: 1 foot = 304.8 mm
NR = Not Required.
ci = continuous insulation.
^a R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
^b "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.
^c The first value is *cavity insulation*, the second value is *continuous insulation (ci)* or *insulated siding*. Therefore, as an example, "13&2ci" means R-13 *cavity insulation* plus R-2 *continuous insulation* or *insulated siding*. Where R-13&2ci is used, non-insulated structural sheathing shall cover no more than 25% of the exterior.
^d Slab insulation shall be installed in accordance with **Section R402.2.10.1**.
^e Basement wall insulation is not required in Warm Humid locations as defined by **Figure R301.1** and **Table R301.1**.
^f Total fill cavity insulation will be deemed as meeting the R-15 requirement.
^g Air-impermeable insulation of R-25&0 or greater may be used if mechanical equipment and air distribution system are located entirely within the *building thermal envelope*. "Air-impermeable" shall be defined as having an air permeance not exceeding 0.02 L/s-m² at 75 Pa pressure differential tested according to ASTM E 2178 or ASTM E 283.
^h R-0&25ci *continuous insulation* can be used where the insulation is completely above the roof framing and sub-roofing.
^{h+} Mass walls shall be in accordance with **Section R402.2.6**. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

Commented [A21]: 2024 IECC model code amended R-value from R49 to R38. Local amendment made to mirror that change.

Commented [A22]: 2024 IECC model code added additional assembly requirement for "Insulation Entirely Above Roof Deck." Local amendment already exists for this assembly in "Attic Roofline" insulation, which includes above and below deck insulation R-value. Local amendment made to mirror change in above deck R-value.

Commented [A23]: Local amendment deleted as no longer needed.

R402.3 Radiant Barriers. A roof radiant barrier with an emittance of 0.05 or less as tested in accordance with ASTM C 1371 or ASTM E 408 is required. The radiant barrier shall be installed according to the manufacturer's instructions. Radiant barriers shall be installed in accordance with ASTM C1743.

A roof radiant barrier is not required for:

Exceptions:

1. Roofs covered with clay or concrete tile having a solar reflectance of 0.40 or greater.
2. Roofs covered with other materials having a solar reflectance of 0.50 or greater.
3. Residential buildings with sealed attics.
4. Residential buildings with mechanical equipment and all ductwork located wholly within the conditioned space.
5. Existing construction where there is no modification to the roof framing structure.

R402.4.1.2 Testing 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. The maximum air leakage rate for any building or dwelling unit under any compliance path shall not exceed 5.0 air changes per hour or 0.28 cubic feet per minute (CFM) per square foot (0.0079 m³/(s × m²)) of dwelling unit enclosure area. Testing shall be conducted in accordance with

Commented [A24]: 2024 IECC model code added requirements for Radiant Barrier where installed. Local amendment was updated to reflect updated ASTM standard and moved to align with model code citation number. Existing requirement for Radiant Barrier and exceptions remain.

Commented [A25]: 2024 IECC model code updated with citation renumbering, clarifying language, inclusion of sampling, and reducing the air leakage targets. Local amendments made to mirror model code. Sampling requirement amended to refer users to existing Batch testing requirements in R403.3.13.

ANSI/RESNET/ICC 380, ASTM E 779, ~~or~~ ASTM E 1827 ~~or~~ ASTM E3158 and reported at a pressure differential of 0.2 inches w.g. water gauge (50 Pascals). Where required by the code official, testing shall be conducted by an approved independent third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. The report shall include address of the residence, building permit number, name and employer of the technician performing the test, and date of the test. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope have been sealed.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures.
3. Interior doors, where installed at the time of the test, shall be open.
4. Exterior or interior terminations for continuous ventilation systems shall be sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

Exceptions:

1. Existing construction where the volume of the conditioned area is unchanged and additions that cannot be physically separated from the existing construction.
2. ~~When testing individual dwelling units, an air leakage rate not exceeding 0.30 cubic feet per minute per square foot [0.008 m³/(s × m²)] of the dwelling unit enclosure area, tested in accordance with ANSI/RESNET/ICC 380, ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pa), shall be an accepted alternative permitted in all climate zones for:~~
 - a. ~~Attached single family and multiple family building dwelling units.~~
 - b. ~~Buildings or dwelling units that are 1,500 square feet (139.4 m²) or smaller.~~
2. For heated, attached private garages and heated, detached private garages accessory to one- and two-family dwellings and townhouses not more than three stories above grade plane in height, building thermal envelope tightness and insulation installation shall be considered acceptable where the items in Table R402.5.1.1, applicable to the method of construction, are field verified. Where required by the code official, an approved third party independent from the installer shall inspect both air barrier and insulation installation criteria. Heated, attached private garage space and heated, detached private garage space shall be thermally isolated from all other habitable, conditioned spaces in accordance with Sections R402.2.13 and R402.4.5, as applicable.
3. Where tested in accordance with Section R402.5.1.2.1 R403.3.13, testing of each dwelling unit or sleeping unit is not required.

Mechanical ventilation shall be provided in accordance with Section M1505 of the International Residential Code or Section 403.3.2 of the International Mechanical Code, as applicable, or with other approved means of ventilation.

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, the building, dwelling units or sleeping units in the building shall have an air leakage rate not greater than 4.0 air changes per hour in Climate Zones 0, 1 and 2, 3.0 air changes per hour in Climate Zones 3 through 5, and 2.5 air changes per hour in Climate Zones 6 through 8.
2. Where complying with Section R401.2.2 or R401.2.3, the building, dwelling units or sleeping units in the building shall have an air leakage rate not greater than 4.0 air changes per hour, or 0.22 cfm/ft² (1.1 L/s x m²) of the building thermal envelope area or testing unit enclosure area, as applicable.

Commented [A26]: New 2024 IECC model language splitting the air leakage testing and rate requirements.

Commented [A27]: FYI: Prescriptive path

Commented [A28]: FYI: Performance or ERI path

Exceptions:

1. 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 cfm/ft² (1.35 L/s x m²) of the testing unit enclosure area. Where adjacent dwelling units or sleeping units are simultaneously tested in accordance with ASTM E779, the air leakage rate is permitted to be not greater than 0.27 cfm/ft² (1.35 L/s x m²) of the testing unit enclosure area that separates conditioned space from the exterior.

2. Where buildings have 1,500 square feet (139.4 m²) or less of conditioned floor area, the air leakage rate is permitted to be not greater than 0.27 cfm/ft² (1.35 L/s x m²).

~~R402.5~~ **R402.6 Maximum Fenestration U-factor and SHGC.** The area-weighted average maximum fenestration U-factor permitted using trade-offs from Section R402.1.5 or R405 shall be 0.50. The area-weighted average maximum SHGC permitted using tradeoffs from Section R405 fenestration facing East, South and West shall be 0.30. The SHGC of fenestration facing within 45 degrees of East and West shall be no greater than 0.25, unless the projection factor multiplier in Table R402.5.1 ~~R402.6.1~~ is applied. Glazed fenestration facing within 45 degrees of North shall not be included in the area-weighted SHGC calculation.

Commented [A29]: Local amendment updated citation and reference numbering.

TABLE ~~R402.5.1~~ R402.6.1 SHGC MULTIPLIER FOR CERTAIN FENESTRATION

Projection Factor	SHGC Multiplier (Glazed fenestration from 45 to 135 degrees and 225 to 315 degrees)	SHGC Multiplier (Glazed fenestration from 135 to 225 degrees)
0.10 - 0.25	0.85	0.75
0.26 - 0.50	0.75	0.60
0.51 - 0.75	0.60	0.40
0.76 - 1.00	0.40	0.20
> 1.00	0.20	0.10

Exception: The maximum U-factor and solar heat gain coefficient (SHGC) for fenestration shall not be required in storm shelters complying with ICC 500.

~~R402.6 Radiant Barrier.~~ A roof radiant barrier with an emittance of 0.05 or less as tested in accordance with ASTM C 1371 or ASTM E 408 is required. The radiant barrier shall be installed according to the manufacturer's instructions

Commented [A30]: See R402.3 Radiant Barrier above

A roof radiant barrier is not required for:

- ~~1. Roofs covered with clay or concrete tile having a solar reflectance of 0.40 or greater.~~
- ~~2. Roofs covered with other materials having a solar reflectance of 0.50 or greater.~~
- ~~3. Residential buildings with sealed attics.~~
- ~~4. Residential buildings with mechanical equipment and all duct work located wholly within the conditioned space.~~
5. Existing construction where there is no modification to the roof framing structure.

~~R402.7 Attic Ventilation.~~ Attic ventilation shall be installed in accordance with the Residential Code or Mechanical Code, respective to the building type. Ventilation shall not be provided where it introduces unconditioned air into the thermal envelope of the building.

Commented [A31]: Local amendment deleted as no longer needed.

R403.1.1.1 Thermostat Connectivity to Internet. The *thermostat* controlling the primary heating or cooling system of the *dwelling unit* shall be capable of connecting to the internet via either a cable or WiFi connection and allow cooling and heating set points to be altered remotely.

Exception: Heating and cooling systems with proprietary *thermostats* or controls that don't allow connection to the internet.

~~R403.3.5~~ R403.3.7 Duct System Testing. Each duct system shall be tested for air leakage in accordance with ANSI/RESNET/ICC 380 or ASTM E1554. Total leakage shall be measured with a pressure differential of 0.1 inch water gauge (25 Pa) across the duct system and shall include the measured leakage from the supply and return ductwork. A written report of the test results shall be signed by the party conducting the test and provided to the code official. Duct system leakage testing at either rough-in or post-construction shall be permitted with or without the installation of registers or grilles. Where installed, registers and grilles shall be sealed during the test. Where registers and grilles are not installed, the face of the register boots shall be sealed during the test. Ducts shall be pressure tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554 to determine air leakage by one of the following methods:

- ~~1. **Rough-in test:** Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. All registers shall be taped or otherwise sealed during the test.~~
- ~~2. **Post construction test:** Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during the test.~~

Exception: A duct air leakage test shall not be required for ducts serving ventilation systems that are not integrated with ducts serving heating or cooling systems.

A written report of the results of the test shall be signed by the party conducting the test and provided to the code official.

- Testing shall not be required for duct systems serving ventilation systems that are not integrated with duct systems serving heating or cooling systems.
- Testing shall not be required where there is not more than 10 feet (3.03 m) of total ductwork external to the space conditioning equipment and both the following are met:
 - The duct system is located entirely within conditioned space.
 - The ductwork does not include plenums constructed of building cavities or gypsum board.
- Where the space conditioning equipment is not installed, testing shall be permitted. The total measured leakage of the supply and return ductwork shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m²) of conditioned floor area.
- Where tested in accordance with ~~Section R403.3.9~~ R403.3.13, testing of each duct system is not required.

~~R403.3.6~~ R403.3.8 Duct System Leakage. The total measured duct system leakage shall not be greater than the values in Table R403.3.8, based on the conditioned floor area, number of ducted returns, and location of the duct system. 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. The total leakage of the ducts, where measured in accordance with Section R403.3.5 ~~R403.3.7~~, shall be as follows:

- ~~1. **Rough-in test:** The total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m²) of conditioned floor area.~~

Commented [A32]: Local amendment renumbered, aligned clarifying language with model code, and updated citation for reference to batch testing.

Commented [A33]: 2024 IECC model code updated with clarifying language and updated duct system leakage targets. Local amendment updated to include the clarifying language however existing more stringent duct system leakage targets were not changed. Since the existing more stringent targets have been required for more 10 years, there is no compelling reason to allow less stringent duct leakage. Additionally, allowances for more duct system leakage may inhibit successful air balancing testing results that is also required by the City of Austin.

2. ~~Post construction test:~~ Total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area.
3. ~~Test for ducts within thermal envelope:~~ Where all ducts and air handlers are located entirely within the building thermal envelope, total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area.
4. ~~In dwelling units served by a single system with a condenser rated at 1.5 tons or less cooling capacity, total leakage shall be no more than 42 cubic feet per minute.~~

TABLE R403.3.8 MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

	Total leakage cfm/100 ft ² (LPM/9.29 m ²)	Total leakage cfm (LPM)
<u>Space conditioning equipment is not installed</u> ^{b,c}	3 (85)	30 (850)
<u>All components of the duct system are installed</u> ^c	4 (113)	42 (1189)
<u>Space conditioning equipment is not installed, but the ductwork is located entirely in conditioned space</u> ^{c,d}		
<u>All components of the duct system are installed and entirely located in conditioned space</u> ^c		

^a A ducted return is a duct made of sheet metal or flexible duct that connects one or more return grilles to the return-side inlet of the air-handling unit. Any other method to convey air from return or transfer grille(s) to the air-handling unit does not constitute a ducted return for the purpose of determining maximum total duct system leakage allowance.

^b Duct system testing is permitted where space conditioning equipment is not installed, provided the return ductwork is installed, and the measured leakage from the supply and return ductwork is included.

^c For duct systems to be considered inside a conditioned space, where the ductwork is located in ventilated attic spaces or unvented attics with vapor diffusion ports, duct system leakage to outside must comply with Item 2.1 of Section R403.3.4.

^d Prior to the issuance of a certificate of occupancy, where the air-handling unit is not verified as being located in conditioned space, the total duct system leakage must be re-tested.

R403.3.8 R403.3.10 Balancing of Air Distribution System. Volumetric airflow in cubic feet per minute (CFM) shall meet the design/application requirements. Airflow testing shall be performed by an independent third-party testing contractor approved by the building official, with all interior doors closed and all blowers operating at cooling speed.

The airflow at each supply register shall be measured. Supply registers with a design airflow exceeding 35 CFM shall have a measured airflow of within ±20% of design airflow. Supply registers with design airflow below 35 CFM but having a measured airflow 60 CFM or higher shall be balanced to bring measured airflow to within ±20% of design airflow. Documentation shall verify that actual total system airflow is within ±10 percent of total system design airflow. All documentation shall be submitted with the final mechanical Code compliance package and provided to the code official.

Measurement of supply airflow shall be performed using a balometer (flow hood) per the manufacturer's instructions.

Documentation shall include the following:

- a. Address of building.
- b. Name and company of technician performing the testing.

Commented [A34]: The criteria for Independence for approved third-party inspection agencies is now included in R107.4.1.1

c. Date of final test.

Exceptions:

1. Ductless systems.
2. Existing construction with no modification of or addition to the existing *ductwork*.
3. An *addition* of 200 square feet or less of *conditioned space* to existing construction.
4. Systems with a Manual J recommended sizing of 4.5 tons or other size not typically available from manufacturers must be balanced to within $\pm 20\%$ of design air flow as indicated on the Manual J for that *building*. It is the responsibility for the HVAC contractor to communicate the lack of availability of a properly sized system to the third-party testing contractor.

R403.3.9 R403.3.11 Pressure Differential. The pressure difference between each bedroom and adjacent interior area (i.e. hallway) shall not exceed 5 Pascals. The pressure difference between the interior area in the vicinity of the return side of the air handling equipment and the outside of the *building* does not exceed -5 Pascals. Testing shall be performed by an *independent* third-party testing contractor *approved* by the building official, with all interior doors closed and all blowers operating at cooling speed.

Exception: Ductless systems where the supply and return airflow are handled by a single unit within the room.

R403.3.10 R403.3.12 System Static Pressure. Total system static pressure with filters installed shall not exceed 0.8 inch water column on gas furnaces and 0.6 inch water column on electric air handlers. Static pressure testing using a digital manometer or magnehelic shall be performed by an *independent* third-party testing contractor *approved* by the building official. Documentation verifying static pressure testing results within the allowed ranges shall be submitted with the final mechanical code compliance package and provided to the *code official*.

Documentation shall include the following:

- a. Address of *building*.
- b. Name and company of third-party testing contractor performing the testing.
- c. Date of final test.
- d. Procedure used for the test.
- e. Results of the test listing static pressure for applications tested.

Exceptions:

1. Existing construction with no modification of or addition to the existing *ductwork*, or replacement of mechanical equipment.
2. Ductless systems.
3. Systems where the air handler equipment is housed within the return plenum.
4. Air handlers for systems having a rated cooling capacity above 55,000 Btu per hour.

R403.3.11 R403.3.13 Batch Testing. For *buildings* having ~~three~~ *eight* or more *dwelling units or sleeping units*, a ~~minimum of 15% of the dwelling units in each building must~~ *seven or 20 percent of the dwelling units or sleeping units, whichever is greater shall* be tested as required by **Sections** ~~R402.4.1.2, R402.5.1.2, R403.3.5, R403.3.7, R403.3.6, R403.3.8, R403.3.8, R403.3.10, R403.3.9, R403.3.11, R403.3.10, R403.3.12, and **R403.6.3**. If each tested *dwelling unit or sleeping unit* within the batch meets code requirements, then all *dwelling units or sleeping units* in the batch are considered to meet code.~~

The third-party testing contractor shall perform all required tests on at least three consecutive *dwelling units or sleeping units*. Test results must meet code requirements before batch testing is allowed. Initial testing is required for each new multifamily project. *Dwelling units or sleeping units* must be within the same *building* to qualify for inclusion in a batch.

Commented [A35]: 2024 IECC model code added sampling code language for air and duct system leakage and mechanical ventilation testing. Existing local amendments require more system testing and allow sampling for all testing. Consolidating sampling protocols is deemed more valuable than separating for each system testing requirement. Local amendment updated with updated citation and reference numbering and alignment with more stringent model code language for number of units in a batch and minimum percentage of dwelling units to test.

Batch Identification and Sampling

The builder shall identify a "batch" which is a *building* where the *dwelling units or sleeping units* are completed and ready for testing. The third-party testing contractor randomly selects at least 15% of the dwelling units and/or sleeping units from a batch for testing. A batch shall include a top floor dwelling unit, a ground floor dwelling unit, a middle floor dwelling unit, and the dwelling unit with the largest conditioned floor area. Where buildings have fewer than eight dwelling units or sleeping units, each dwelling unit or sleeping units shall be tested. All dwelling units or sleeping units within the batch must be ready for testing (drywall complete, interior door jams installed, HVAC system installed, and final air sealing completed) before the third-party testing contractor can select the units to be tested.

Failure to Meet Code Requirement(s)

- a. If any *dwelling units or sleeping units* within the identified batch fail to meet a code requirement as a result of testing, the builder will be directed to fix the cause(s) of failure, and 30% of the remaining *dwelling units or sleeping units* in the batch will be randomly selected for testing regarding the specific cause(s) of failure.
- b. If any failures occur in the additional *dwelling units or sleeping units*, all remaining *dwelling units or sleeping units* in the batch must be individually tested for code compliance.
- c. A multifamily project with 3 failures within a 6-month period is no longer eligible to use the sampling protocol in that community or project until successfully repeating "Initial Testing." Sampling can be reinstated after at least 3 consecutive *dwelling units or sleeping units* are individually verified to meet all code requirements.
- d. No *dwelling unit or sleeping units* in a batch may be issued a Certificate of Occupancy until testing has been performed and passed on the *dwelling units or sleeping units* selected for testing.

R403.3.12 Filtration for Air Distribution Systems. Filters installed in air distribution systems shall have a minimum efficiency reporting value (MERV) rating of 6 or greater. Filters shall be located to prevent unfiltered air from passing through the mechanical equipment. Filters shall be installed prior to operation of the air handling unit.

~~**R403.5.4 Demand Response of Electric Resistance Water Heating.** Electric resistance water heaters shall be controlled by a preprogrammed water heater timer. The timer shall be preprogrammed to turn the water heater off between the hours of 3:00 p.m. and 7:00 p.m. from June 1 to September 30. The timer shall have a readily accessible override, as defined by the building official, capable of restoring power to the water heater for one hour when activated. The timer shall be permanently programmed by the manufacturer or locked to prevent alteration of the programming by the building occupants.~~

~~Buildings that are accessory to a residential building are considered residential buildings for the purposes of this section.~~

~~Exceptions:~~

- ~~a. Heat pump water heater installed where electric resistance is the secondary means of heating.~~
- ~~b. Water heater installed with an OpenADR certified communications module or ANSI/CTA-2045 certified port allowing for remote management or other demand response capability as approved by the code official.~~

R403.6.3 Testing. Mechanical ventilation systems shall be tested and verified to provide the minimum ventilation flow rates required by Section R403.6, in accordance with ANSI/RESNET/ICC 380. 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 be signed by the party conducting the test and provided to the code official.

Exceptions:

1. Kitchen range hoods that are ducted to the outside with ducting having a diameter of 6 inches (152 mm) or larger, a length of 10 feet (3048 mm) or less, and not more than two 90-degree (1.57 rad) elbows or equivalent shall not require testing.

Commented [A36]: 2024 IECC model code added demand response code language for electric storage water heaters in Appendix RJ. Local amendment already existed. Local amendment, R403.5.4 deleted and updated to mirror model code in Appendix RJ. Allowance added for timers in the exceptions.

Commented [A37]: 2021 IECC model code introduced mechanical ventilation testing. Updates in the 2024 IECC include adding the RESNET 380 standard, updating allowed exceptions, and adding an allowance for sampling. Local amendment made to include mechanical ventilation testing in existing sampling requirements in R403.3.13.

2. ~~A third-party test shall not be required where the ventilation system has an integrated diagnostic tool used for airflow measurement, and a user interface that communicates the installed airflow rate.~~
3. ~~Where tested in accordance with Section R403.6.4 R403.3.13, testing of each mechanical ventilation system is not required.~~

R403.7.1 R403.7.2 Documentation of Heating and Cooling Equipment Sizing. Documentation verifying the methodology and accuracy of heating and cooling equipment sizing shall be submitted with final mechanical code compliance package. Documentation shall include the following information:

- a. Address of residence.
- b. Name of individual performing load calculations.
- c. Name and version of load calculation software.
- d. Design temperatures (outdoor and indoor) according to the Air Conditioning Contractors of America's (ACCA) Manual J, ACCA Manual N, American Society of Heating, Refrigeration and Air-Conditioning Engineers, U.S. Department of Energy standards, or other methodology *approved* by the City of Austin.
- e. Area of walls, windows, skylights and doors within $\pm 10\%$ of architectural plans or actual *building*.
- f. Orientation of windows and glass doors, *infiltration* rate, *duct* loads, internal gains, insulation values, and *Solar Heat Gain Coefficient* of windows.
- g. Heating and cooling load calculations.
- h. Design supply airflows for each room.

R403.9 R403.14 Space Heating. The use of electric resistance as a primary source of space heating is prohibited in all *dwelling units* or *sleeping units* having a *conditioned floor area* in excess of 500 square feet.

Exception: *Buildings* where *dwelling units* are cooled using chilled water.

R405.2 Simulated Building Performance-based Compliance. Compliance based on ~~total~~ *simulated building performance* requires that a *building proposed design meets all of comply with* the following:

1. The requirements of the sections indicated within **Table R405.2**.
2. The ~~proposed total building thermal envelope thermal conductance (TC)~~ shall be ~~greater~~ *less* than or equal to ~~the required total building thermal envelope TC using the prescriptive U-factors and F-factors from Table R402.1.2(1) for existing buildings and Table R402.1.2(2) for new construction multiplied by 1.08 in Climate Zone 2 in accordance with Equation 4-2 and Section R402.1.5. The area-weighted maximum fenestration SHGC permitted in Climate Zone 2 shall be 0.30, levels of efficiency and solar heat gain coefficients in Table R402.1.1 or R402.1.3 of the 2012 International Energy Conservation Code as amended by Ordinance No. 20130606-091.~~

Equation 4-2: $TC_{\text{Proposed design}} \leq 1.08 \times TC_{\text{Prescriptive reference design}}$

3. ~~Annual energy use that is less than or equal to the annual energy use of the standard reference design. For each dwelling unit with one or more fuel-burning appliances for space heating, water heating, or both, the annual energy cost use of the dwelling unit shall be less than or equal to 80 percent of the annual energy cost use of the standard reference design. For all other dwelling units, the annual energy cost use of the proposed design shall be less than or equal to 85 percent of the annual energy cost use of the standard reference design. For each dwelling unit with greater than 5,000 square feet (465 m²) of living space located above grade plane, the annual energy cost use of the dwelling unit shall be reduced by an additional 5 percent of annual energy cost use of the standard reference design.~~

Exception: Fenestration U-factor of 0.50 is allowed if offset by cooling and/or heating system efficiency.

Exceptions:

Commented [A38]: Updated to include sleeping units in alignment with other 2024 IECC model code updates.

Commented [A39]: 2024 IECC model code updated R405.2 by changing the backstop methodology, increased the savings above baseline requirement, and updated source energy factors. In the 2021 IECC the savings above baseline was an option within the R401.2.5 Additional Energy Efficiency requirement. The 2024 IECC has tried to simplify by only include a savings above baseline in the R405 pathway. R408 will only apply to prescriptive path users. Local amendments recommend using the new 2024 language and retain the existing energy use requirement as allowed in Exception 1.

1. The energy use based on source energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost. The source energy multiplier for electricity shall be 2.51. The source energy multipliers shall be 1.09 for natural gas, 1.15 for propane, 1.19 for fuel oil, and 1.30 for imported liquified natural gas.
2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost.

Table R405.2 REQUIREMENTS FOR TOTAL SIMULATED BUILDING PERFORMANCE

SECTION ^a	TITLE
General	
R401.2.5	Additional energy efficiency
R401.3	Certificate
Building Thermal Envelope	
R402.1.1	Vapor retarder
R402.1.6	Rooms containing fuel burning appliances
R402.2.3	Eave baffles Attic knee wall
R402.2.4	Eave baffle
R402.2.4.1 R402.2.5.1	Access hatches and door insulation installation and retention
R402.2.10.1	Crawl space wall insulation installations Slab-on-grade floors
R402.2.11	Crawl space walls insulation installations
R402.3	Radiant barriers
R402.5.1.1	Installation
R402.4 R402.5.1.2	Testing Air leakage testing
R402.5.1.3	Maximum air leakage rate
R402.5.2	Fireplaces
R402.5.3	Fenestration air leakage
R402.5.4	Recessed lighting
R402.5.5	Air-sealed electrical and communication outlet boxes
R402.5 R402.6	Maximum fenestration U-factor and SHGC
R402.6	Radiant Barrier
Mechanical	
R403.1	Controls
R403.2	Hot water boiler temperature reset
R403.3, except Sections R403.3.2, R403.3.3, R403.3.11	Ducts systems and Additional HVAC Testing
R403.4	Mechanical system piping insulation
R403.5	Service hot water system
R403.5.1 except Section R403.5.2	Heated water circulation and temperature maintenance systems
R403.5.3	Drain water heat recovery units
R403.5.4	Demand Response of Electric Resistance Water Heating
R403.6	Mechanical ventilation
R403.7, except Section R403.7.1	Equipment sizing and efficiency rating
R403.8	Systems serving multiple dwelling units
R403.9	Space heating

Commented [A40]: Table updated to match model code updates, retain prior local amendments and include new local amendments.

R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
R403.13	Gas fireplaces
R403.15	Snow melt and ice system controls
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
Chapter 7 [RE]	Residential Solar Ready
Appendix RE	Electric Vehicle Power Transfer
Appendix RJ	Demand Responsive Controls
Appendix RK	Electric Readiness

^a Reference to a code section includes all the relative subsections except as indicated in the table.

TABLE R405.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass; otherwise wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: from Table R402.1.2(2)	As proposed
	Solar reflectance absorptance = 0.75 0.25	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: from Table R402.1.2(2) , with insulation layer on interior side of walls.	As proposed
Above-grade floors	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: from Table R402.1.2(2)	As proposed
Ceilings	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-factor: from Table R402.1.2(2)	As proposed
Roofs	Type: composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar reflectance absorptance = 0.75 0.25	As proposed
	Emittance = 0.90	As proposed
	Radiant barrier per R402.6 R402.3	As proposed
Attics	Type: vented with an aperture of 1 ft² per 300 ft² of ceiling area.	As proposed

Commented [A41]: Table updated to match model code updates, retain prior local amendments and include new local amendments.

Commented [A42]: Accidentally not added in 2021. Added now to align with model code.

Foundations	Type: same as proposed	As proposed
	Foundation wall extension area above and below grade: same as proposed. <u>Foundation wall or slab perimeter length: same as proposed.</u> and	<u>As proposed</u>
	Soil characteristics: same as proposed <u>Foundation wall U-factor and slab-on-grade F-factor: as specified in Table R402.1.2(2)</u>	<u>As proposed</u>
Opaque doors	Area: 40 ft ²	As proposed
	Orientation: North	As proposed
	U-factor: same as fenestration from Table R402.1.2(2)	As proposed
Vertical fenestration other than opaque doors	Total area ^h = 15% of <i>conditioned floor area</i>	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W)	As proposed
	U-factor: area-weighted average of 0.35	As proposed
	SHGC: 0.25	As proposed
	Interior shade fraction: 0.92 – (0.21 x SHGC for the standard reference design)	<u>Interior shade fraction: 0.92 – (0.21 x SHGC as As proposed</u>
	External shading: none	As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air exchange leakage rate	For detached one-family dwellings, the The air leakage rate at a pressure of 0.2 inch w.g. water gauge (50 Pa) shall be 5 4 air changes per hour. For detached one-family dwellings that are 1,500 ft² (139.4 m²) or smaller and attached dwelling units or sleeping units, the air leakage rate at a pressure of 0.2 inch water gauge (50 Pa) shall be 0.27 cfm/ft² of the testing unit enclosure area. The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than 0.01 x CFA + 7.5 x (N + 1) where: CFA = conditioned floor area, ft². N = number of bedrooms. The mechanical ventilation system type shall be the same as in the proposed design. Energy recovery shall not be assumed for mechanical ventilation.	The measured air <u>leakage exchange rate</u> . ^a <u>The mechanical ventilation rate^b shall be in addition to the air leakage rate and shall be as proposed.</u>

<p>Mechanical ventilation rate</p>	<p>Where mechanical ventilation is not specified in the proposed design: None Where mechanical ventilation is specified in the proposed design, the annual vent fan energy use, in units of kWh/yr, shall equal $(1/e_e) \times \{0.0876 \times (CFA + 65.7 \times (N_{br} + 1))\}$ Where: e_e = the minimum exhaust fan efficacy, as specified in Table R403.6.2, corresponding to the system type at a flow rate of $0.01 \times CFA + 7.5 \times (N_{br} + 1)$ CFA = conditioned floor area, ft² N_{br} = number of bedrooms The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than B x M where: $B = 0.01 \times CFA + 7.5 \times (N_{br} + 1)$, cfm. M = 1.0 where the measured air leakage rate is ≥ 3.0 air changes per hour at 50 Pascals, and otherwise, M = minimum (1.7, Q/B) Q = the proposed mechanical ventilation rate, cfm. CFA = conditioned floor area, ft² N_{br} = number of bedrooms.</p>	<p>The measured mechanical ventilation rate^b, Q_v shall be in addition to the measured air leakage rate and shall be as proposed.</p>
<p>Mechanical ventilation fan energy</p>	<p>The mechanical ventilation system type shall be the same as in the proposed design. Heat recovery or energy recovery shall be modeled for mechanical ventilation where required by Section R403.6.1. Heat recovery or energy recovery shall not be modeled for mechanical ventilation where not required by Section R403.6.1. Where mechanical ventilation is not specified in the proposed design: None Where mechanical ventilation is specified in the proposed design, annual vent fan energy use, in units of kWh/yr, shall equal: $(8.76 \times B \times M) / e_e$ where: B and M are determined in accordance with the air exchange mechanical ventilation rate row of this table. e_e = the minimum exhaust fan efficacy, as specified in Table R403.6.2, corresponding to the system type at a flow rate of B x M</p>	<p>As proposed</p>
<p>Internal gains</p>	<p>IGain, in units of Btu/day per dwelling unit, shall equal $17,900 + 23.8 \times CFA + 4,104 \times N_{br}$ where:</p>	<p>Same as standard reference design.</p>

	<u>CFA = conditioned floor area, ft².</u> <u>N_{br} = number of bedrooms.</u>		
Internal Mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area	Same as standard reference, plus any additional mass <u>specifically</u> designed as a thermal storage element ^c but not integral to the <i>building thermal envelope</i> or structure	
Structural mass	For masonry floor slabs, 80% of floor are covered by R-2 carpet and pad, and 20% of floor directly exposed to room air.	As proposed	
	<u>For masonry basement walls: as proposed, but with insulation as specified in Table R402.1.3, located on the interior side of the walls.</u>	<u>As proposed</u>	
	For other walls, for ceilings, floors, and interior walls, wood frame construction.	As proposed	
Heating systems ^{d, e, i, k}	<u>Prevailing federal minimum efficiency</u> <u>Fuel Type: Same as proposed design</u> Capacity: <u>same as proposed design</u> and in accordance with Section R403.7	As proposed	
	<u>Product class: Same as proposed design</u>	As proposed	
	<u>Efficiencies:</u>	As proposed	
	<u>Heat pump: Complying with 10 CFR §430.32</u>	As proposed	
	<u>Fuel gas and liquid fuel furnaces: Complying with 10 CFR §430.32</u>	As proposed	
Cooling systems ^{d, f, k}	<u>Prevailing federal minimum efficiency</u> <u>Fuel Type: Electric</u> Capacity: <u>same as proposed design</u> and in accordance with Section R403.7	As proposed	
	<u>Efficiencies: Complying with 10 CFR §430.32</u>	<u>As proposed</u>	
Service water heating ^{d, g, k}	<u>As proposed:</u> Use, in units of gal/day = 25.5 + (8.5 x N _{br}) Where N _{br} = number of bedrooms	<u>As proposed</u> Use, in units of gal/day = (25.5 + (8.5 x N _{br}))* (1-HWDS) Where: N _{br} = number of bedrooms. HWDS = factor for the compactness of the hot water distribution system	
		Compactness ratio ⁱ	
		HWDS Factor	
		1 story	2 or more stories
		> 60%	> 30%
	> 30% to ≤ 60%	> 15% to ≤ 30%	0.05

Commented [A43]: Coord with Christian and PH on proposed changes

		> 15% to ≤ 30%	> 7.5% to ≤ 15%	0.10
		≤ 15%	≤ 7.5%	0.15
	<u>Fuel Type: Same as proposed design</u>	<u>As proposed</u>		
	<u>Rated Storage Volume: Same as proposed design</u>	<u>As proposed</u>		
	<u>Draw Pattern: Same as proposed design</u>	<u>As proposed</u>		
	<u>Efficiencies: Uniform Energy Factor complying with 10 CFR §430.32</u>	<u>As proposed</u>		
	<u>Tank Temperature: 120° F (48.9° C)</u>	<u>Same as standard reference design</u>		
Thermal distribution systems	Duct insulation: in accordance with Section R403.3.1 Section R403.3.3 . 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. Duct location: same as proposed design. Exception: For nonducted 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 (113.3 L/min) per 100 ft ² (9.29 m ²) of conditioned floor area at a pressure of differential of 0.1 inch w.g. (25 Pa).	Duct insulation: as proposed ^m . <u>As tested or, where not tested, as specified in Table R405.4.2(2)</u>		
	Duct location:	Duct location: as proposed ^l		
	<u>Foundation Type</u>	<u>Slab on grade</u>	<u>Unconditioned crawl space</u>	<u>Basement or conditioned crawl space</u>
<u>Duct location (supply and return)</u>	<u>One-story building: 100% in unconditioned attic. All other: 75% in unconditioned attic and 25% inside conditioned space</u>	<u>One-story building: 100% in unconditioned crawlspace. All other: 75% in unconditioned crawlspace and 25% inside</u>	<u>75% inside conditioned space 25% unconditioned attic</u>	

			<u>conditioned space</u>	
				<p><u>Duct system leakage to outside:</u> For duct systems serving > 1,000 ft² (92.9 m²) of <u>conditioned floor area</u>, the duct leakage to outside rate shall be 4 cfm (113.3 L/min) per 100 ft² (9.29 m²) of <u>conditioned floor area</u>. For duct systems serving ≤ 1,000 ft² (92.9 m²) of <u>conditioned floor area</u>, the duct leakage to outside rate shall be 40 cfm (1132.7 L/min).</p>
				<p><u>Duct System Leakage to Outside:</u> The measured total <u>duct system leakage rate</u> shall be entered into the software as the <u>duct system leakage to outside rate</u>. Exceptions: 1. Where <u>duct system leakage to outside</u> is tested in Accordance ANSI/ RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered. 2. Where total <u>duct system leakage</u> is measured without the <u>space conditioning equipment</u> installed, the simulation value shall be 4 cfm (113.3 L/min) per 100 ft² (9.29 m²) of <u>conditioned floor area</u>.</p>
				<p><u>Distribution System Efficiency (DSE):</u> For hydronic systems and ductless systems a thermal <u>distribution system efficiency (DSE)</u> of 0.88 shall be applied to both the heating and cooling system efficiencies.</p>
				<p><u>Distribution System Efficiency (DSE):</u> For hydronic systems and ductless systems, DSE shall be as specified in Table R405.4.2(2).</p>
Thermostat	Type: Programmable, cooling temperature setpoint = 75°F Heating temperature setpoint = 72°F			Same as <u>standard reference design</u> .
Dehumidistat	Where a mechanical <u>ventilation</u> system with latent heat recovery is not specified in the <u>proposed design</u> : None. Where the <u>proposed design</u> utilizes a mechanical <u>ventilation</u> system with latent heat recovery: Dehumidistat type: Manual, setpoint = 60% relative humidity. Dehumidifier: whole-home <u>dwelling</u> with integrated energy factor = 1.77 liters/kWh.			Same as <u>standard reference design</u> .

R406.2 ERI Compliance Compliance based on the Energy Rating Index (ERI) requires that the rated design and as-built dwelling unit meet meets all of the following:

1. The requirements of the sections indicated within Table R406.2.
2. Maximum ERI value indicated in of Table R406.5.

Commented [A44]: Amendment deleted as no longer needed.

Table R406.2 REQUIREMENTS FOR ENERGY RATING INDEX

Commented [A45]: Table updated to match model code updates, retain prior local amendments and include new local amendments.

SECTION ^a	TITLE
General	
R401.2.5	Additional energy efficiency
R401.3	Certificate
Building Thermal Envelope	
R402.1.1	Vapor retarder
R402.1.6	Rooms containing fuel burning appliances
R402.2.3 R402.2.4	Eave baffle
R402.2.4.1 R402.2.5.1	Access hatches and doors insulation installation and retention
R402.2.10	Slab-on-grade floors
R402.2.10.1 R402.2.11	Crawl space walls insulation installations
R402.3	Radiant barriers
R402.5.1.1	Installation
R402.4 R402.5.1.2	Air Leakage testing
R402.5.1.3	Maximum air leakage rate
R402.5.2	Fireplaces
R402.5.3	Fenestration air leakage
R402.5.4	Recessed lighting
R402.5.5	Air-sealed electrical and communication outlet boxes (air sealed boxes)
R402.5 R402.6	Maximum fenestration U-factor and SHGC
R402.6	Radiant Barrier
R406.3	Building thermal envelope
Mechanical	
R403.1	Controls
R403.2	Hot water boiler temperature reset
R403.3 , except Sections R403.3.2, R403.3.3, R403.3.10	Ducts systems and Additional HVAC Testing
R403.4	Mechanical system piping insulation
R403.5	Service hot water systems
R403.5.1 except Section R403.5.2	Heated water circulation and temperature maintenance systems
R403.5.3	Drain water heat recovery units
R403.5.4	Demand Response of Electric Resistance Water Heating
R403.6	Mechanical ventilation
R403.7 , except Section R403.7.1	Equipment sizing and efficiency rating
R403.8	Systems serving multiple dwelling units
R403.9	Space heating
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas

R403.14	Gas fireplaces
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R406.3	Building thermal envelope
Chapter 7 [RE]	Residential Solar Ready
Appendix RE	Electric Vehicle Power Transfer
Appendix RJ	Demand Responsive Controls
Appendix RK	Electric Readiness

^a Reference to a code section includes all the relative subsections except as indicated in the table.

~~[R406.3.2 On-site renewables are included.](#) Where on-site renewable energy is included for compliance using the ERI analysis of Section R406.4, the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the 2015 International Energy Conservation Code as amended by Ordinance No. 20160623-099.~~

Commented [A46]: Amendment deleted as content is now covered by model code. Backstop updated in model code to no longer refer to a prior code.

~~[R406.4 Energy Rating Index.](#) The Energy Rating Index (ERI) shall be determined in accordance with RESNET/ICC 301 except for buildings covered by the International Residential Code, the ERI Reference Design Ventilation rate shall be in accordance with Equation 4-2. The ERI shall consider all energy used in the residential building.~~

Commented [A47]: Amendment deleted as no longer needed.

~~Ventilation rate, CFM = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)]~~

~~Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the ERI reference design or the rated design. For compliance purposes, any reduction in energy use of the rated design associated with on-site renewable energy shall not exceed 5 percent of the total energy use.~~

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX
2	59

Commented [A48]: Amendment deleted to revert to model code requirements.

~~**R503.1.1.1 Replacement fenestration.** [Fenestration Alterations.](#) Where new fenestration area is added to an existing building, the new fenestration shall comply with Section R402.4. Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and SHGC as specified in Table R402.1.3(1). Where more than one replacement fenestration unit is to be installed, an area-weighted average of the U-factor, SHGC or both of all replacement fenestration units shall be an alternative that can be used to show compliance.~~

Commented [A49]: Updated to match model code updates. Points to new fenestration requirements when new fenestration is being installed in an alteration.

CHAPTER 7 [RE] Residential Solar Ready

~~**R701.1 Residential Solar Ready.** New Residential Buildings must have a Solar-Ready Zone. [A Solar-Ready Zone is a section or sections of the roof or building structure designated and reserved for future installation of a solar photovoltaic or solar thermal system.](#) The Solar-Ready Zone must not include areas shaded by parts of the building or other obstructions.~~

Commented [A50]: Definition for solar-ready zone now exists in Definitions section in Chapter 2.

~~**R701.2 Construction document requirements for Solar-Ready Zone.** [Construction documents must indicate the Solar-Ready Zone on a roof plan.](#)~~

Commented [A51]: This requirement is now included in R105.2.2 with other Construction Documents requirements.

~~**R701.3 R701.2 Obstructions.** Solar-Ready Zones must be free from and not shaded by obstructions, including but not limited to vents, chimneys, parapets and roof-mounted equipment.~~

Commented [A52]: Renumbering due to deletion of R701.2

~~**R701.4 R701.3 Electrical Service Reserved Space.** The main electrical service panel must have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and must be labeled "For Solar Electric." The reserved space must be positioned at the opposite (load) end from the input feed location or main~~

circuit location. Wall area must have a reserved space to allow installation of an Austin Energy PV meter per the Austin Energy Design Criteria manual.

Commented [A53]: Added requirement for the reservation of wall space to be ready for future installation of PV meter.

R701.5 R701.4 One-family and Two-family Dwellings. New detached one-family or two-family dwellings must have a total *Solar-Ready Zone* area of not less than 240 square feet (22.3 m²) per dwelling, exclusive of required access or setback areas. The *Solar-Ready Zone* must be oriented between 90 and 300 degrees of true North. The *Solar-Ready Zone* must comprise areas not less than six feet (1.83 m) on one side and at least one area of not less than 100 square feet (9.29 m²) exclusive of any required access or set back areas.

Exceptions:

1. A *Building* with less than 800 square feet (74.32 m²) of roof area per *dwelling unit*.
2. A *Building* with a *Solar-Ready Zone* that is shaded by trees or adjacent structures for more than 50 percent of annual daylight hours.
3. A *Building Site* on which the applicant has demonstrated, through documentation, existence of a unique hardship preventing compliance.
4. New *residential buildings* with a permanently installed *on-site renewable energy* system with an output of not less than one watt per square foot (0.092 m²) of *conditioned floor area*, or an *on-site renewable energy* system with a total output of at least two kilowatts.

R701.6 R701.5 Townhomes Townhouses, Townhomes New Townhouses must have a total *Solar-Ready Zone* area of not less than 160 square feet (14.86 m²) per *dwelling townhouse unit*, exclusive of required access or setback areas. The *Solar-Ready Zone* must be oriented between 90 and 300 degrees of true North. The *Solar-Ready Zone* must comprise areas not less than six feet (1.83 m) on a side and at least one area of not less than 100 square feet (9.29 m²) exclusive of required access or set back areas.

Commented [A54]: Updated "townhome" lang to "townhouse: since it is a defined term in Ch2

Commented [A55]: Updated "townhomes" and "dwellings" to "townhouses" as townhouses is a defined term. Added "New" to align with R701.4 and R701.6.

Exceptions:

1. Dwellings Townhouses with less than 600 square feet (55.74 m²) of roof area per *dwelling townhouse unit*.
2. A *building* with a *Solar-Ready Zone* that is shaded by trees or adjacent structures for more than 50 percent of annual daylight hours.
3. A *Building Site* on which the applicant has demonstrated, through documentation, existence of a unique hardship preventing compliance.

R701.7 R701.6 Multifamily Buildings. New multifamily *buildings* of four stories or fewer must have a *Solar-Ready Zone* that is not less than 35% of the total roof area of the *building*.

Exceptions:

1. A *building* with a *Solar-Ready Zone* that is shaded by trees or adjacent structures for more than 50 percent of annual daylight hours.
2. A *Building Site* on which the applicant has demonstrated, through documentation, existence of a unique hardship preventing compliance.

RJ101.1 Demand Responsive Water Heating. Electric storage water heaters 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 RJ101.1.

Commented [A56]: 2024 IECC model code added demand response code language for electric storage water heaters in Appendix RJ. Local amendment already existed. Local amendment, R403.5.4 deleted and updated to mirror model code in Appendix RJ. Allowance added for timers in the exceptions.

Exceptions:

1. Water heaters that are controlled by a preprogrammed water heater timer. The timer shall be preprogrammed to turn the water heater off between the hours of 3:00 p.m. and 7:00 p.m. from June 1 to September 30. The timer shall have a readily accessible override, as defined by the building official,

capable of restoring power to the water heater for one hour when activated. The timer shall be permanently programmed by the manufacturer or locked to prevent alteration of the programming by the building occupants. Buildings that are accessory to a residential building are considered residential buildings for the purposes of this section.

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

RK101.1 Electric readiness. Water heaters, household clothes dryers and cooking appliances that use fuel gas or liquid fuel shall comply with Sections RK101.1.1 through ~~RK101.1.4~~ RK101.1.5.

RK101.1.5 Water Heater Space. A space that is at least 3 feet (0.91 m) by 3 feet (0.91 m) wide by 7 feet (2.13) high shall be available surrounding or within 3 feet (0.91 m) of the installed water heater.

Exceptions:

1. Installed heat pump water heaters.
2. Installed tankless water heaters on the exterior of the dwelling unit.
3. Water heaters serving multiple dwelling units in a R-2 occupancy.

Commented [A57]: Updated to include additional requirement, RK101.1.5.

Commented [A58]: Local amendment to include water heater space requirement originally included in code proposal from DOE. Water heater space requirement included in DOE Zero Energy Ready Home, California Title 24, Massachusetts Specialized Stretch Code, and New York State Energy Code. Water heater space requirement requested by Austin Electric Utility Commission.