

**2022 AMENDMENTS TO THE 2021
EDITION OF THE INTERNATIONAL
RESIDENTIAL CODE
AND APPENDICES AS PUBLISHED
BY
INTERNATIONAL CODE COUNCIL
(ICC)**

The content of the sections in this Code that begin with a letter or letters designations are maintained by other City or State entities.

[B]	Denotes International Building Code
[P]	International Plumbing Code
[R]	International Residential Code
[EB]	Existing Building
[CRS]	Colorado Revised Statute
[DOTI]	Department of Transportation and Infrastructure /Wastewater Management

CHAPTER 1 ADMINISTRATION

SECTION R101

TITLE, SCOPE AND PURPOSE

[R] Section R101.1 Title is replaced in its entirety as follows:

R101.1 Title. These provisions shall be known as the Residential Code for ~~One- One~~ and Two-Family Dwellings of the City and County of Denver and shall be cited as such and will be referred to herein as “this Code”.

[R] Section R101.2 Scope is amended by replacing the Exception as follows:

Exceptions:

1. The following shall be permitted to be constructed in accordance with this code:
 - 1.1. Live/work units located in townhouses and complying with the requirements Section ~~419 508.5~~ of the *International Building Code* where provided with a residential fire sprinkler system complying with the *International Building Code* Section 903.3.1.2 NFPA 13R sprinkler system.
 - 1.2. A care facility with five or fewer persons receiving custodial care within a dwelling unit where provided with a residential fire sprinkler system complying with the *International Building Code* Section 903.3.1.3 NFPA 13D sprinkler system.
 - 1.3. A care facility with five or fewer persons receiving medical care within a dwelling unit where provided with a residential fire sprinkler system complying with the *International Building Code* Section 903.3.1.3 NFPA 13D sprinkler system.
 - 1.4. A care facility for five or fewer persons receiving care that are within a single-family dwelling where provided with a residential fire sprinkler system complying with the *International Building Code* Section 903.3.1.3 NFPA 13D sprinkler system.
2. The following shall be permitted to be constructed in accordance with this code without a fire sprinkler system:
 - 2.1. *Lodging houses* with five or fewer guestrooms and 10 or fewer total occupants.
 - 2.2. Detached *dwelling units* used as a *congregate living facility* or a *boarding house (transient or nontransient)* with 10 or fewer occupants.
3. The following shall be permitted to be constructed in accordance with this code without a fire sprinkler system: One-Family Dwellings licensed as short term rental residences under Denver Revised Municipal Code Article II Chapter 33 .
4. The provisions of Section 3114 of the Denver Amendments to the *International Building Code* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use, and occupancy of Manufactured Homes.
5. A *Family Child Care Home* (FCCH) complying with the provisions of Appendix Chapter M of the *International Residential Code* and located within a one-family dwelling, a *dwelling unit* of a side-by-side two-family dwelling, or a *townhouse* unit with frontage within 125 ~~feet ft~~ (38.1m) of a street or fire access road. Such FCCH shall be permitted to be constructed in accordance with this

Commented [MOU1]: Reorganization in 2021 IBC.

code without a fire sprinkler system.

A Certificate of Occupancy is required for all *Family Child Care Homes*, providing care for six (6) or more children. In accordance with the provisions of Appendix M of the *International Residential Code*, such FCCH will be classified as a Group R-3 Home Day Care Occupancy.

[R] Section R102.4.1 Safeguards during construction is added as follows:

R102.4.1. Safeguards during construction. Chapter 33 “Safeguards During Construction” of the *International Building Code* thereto shall apply to all work regulated by the *International Residential Code*.

Section R102.7 Existing structures is replaced in its entirety as follows:

R102.7 Existing structures. The legal occupancy of any structure existing on the date of adoption of this code shall be permitted to continue without change, except as specifically covered in this code or the *International Fire Code*, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

Sections R103 through R114 are deleted in their entirety. In addition to the 2019 Administration of the Denver Building Code the sections below shall govern.

R104.9 Approved materials and equipment. Materials, *equipment* and devices *approved* by the *building official* shall be constructed and installed in accordance with such approval.

R105.2.2 Repairs. Application or notice to the *building official* is not required for ordinary repairs to structures, replacement of lamps or the connection of *approved* portable electrical *equipment* to *approved* permanently installed receptacles. Such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or cutting of any structural beam or load-bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall ordinary repairs include *addition* to, *alteration* of, replacement or relocation of any water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, electric wiring or mechanical or other work affecting public health or general safety.

R105.8 Responsibility. It shall be the duty of every person who performs work for the installation or repair of building, structure, electrical, gas, mechanical or plumbing systems, for which this code is applicable, to comply with this code.

R105.9 Preliminary inspection. Before issuing a *permit*, the *building official* is authorized to examine or cause to be examined buildings, structures and sites for which an application has been filed.

~~**R106.1.2 Energy compliance.** The Building Official is authorized to require additional documentation through written policy to ensure compliance with the *International Energy Conservation Code*.~~

R106.1.2 Manufacturer’s installation instructions. Manufacturer’s installation instructions, as required by this code, shall be available on the job site at the time of inspection.

R106.1.3 Information on braced wall design. For buildings and structures utilizing braced wall design, and where required by the *building official*, braced wall lines shall be identified on the *construction documents*. Pertinent information including, but not limited to, bracing methods, location and length of *braced wall panels* and foundation requirements of braced wall panels at top and bottom shall be provided.

R106.2 Site plan or plot plan. The *construction documents* submitted with the application for *permit* shall be accompanied by a site plan showing the size and location of new construction and existing structures on the site and distances from *lot lines*. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site

or plot. The *building official* is authorized to waive or modify the requirement for a site plan where the application for *permit* is for *alteration* or repair or where otherwise warranted.

R106.4 Amended construction documents. Work shall be installed in accordance with the *approved construction documents*, and any changes made during construction that are not in compliance with the *approved construction documents* shall be resubmitted for approval as an amended set of *construction documents*.

R110.1 Use and occupancy. A building or structure shall not be used or occupied in whole or in part, and a *change of occupancy* or change of use of a building or structure or portion thereof shall not be made, until the *building official* has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the *jurisdiction*. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the *jurisdiction* shall not be valid.

Exception: Certificates of occupancy are not required for work exempt from permits under Section 142 of the Administration of the 2022 Denver Building Code ~~Administrative Provisions~~.

R113.1 Unlawful acts. It shall be unlawful for any person, firm or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or *equipment* regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

Commented [MOU2]: New language in 2021. These sections are copied from the IRC.

CHAPTER 2 DEFINITIONS

SECTION R202 DEFINITIONS

Section R202 is modified by adding the following definitions:

SLEEPING ROOM. Any room used or intended to be used for sleeping purposes and habitable space with a closet; however, unless otherwise determined at the sole discretion of the *building code official*.

FAMILY CHILD CARE HOME (FCCH). A dwelling unit in which care is provided on a regular basis, for less than ~~24-hours~~ ~~24 hrs~~ at any time, in the provider's place of residence, for two ~~(2)~~ or more children up to 18 years of age who are not directly related to the caregiver by blood, marriage, or adoption. The residents of the home under ~~12~~ ~~twelve~~ ~~(12)~~ years of age who are on the premises, in addition to all unrelated children who are on the premises for supervision, are counted as children receiving care.

A regular Family Child Care Home provides care for no more than six ~~(6)~~ children, with no more than two ~~(2)~~ children under ~~2 1/2~~ ~~two and one half~~ ~~(2-1/2)~~ years of age. Care may be provided for two ~~(2)~~ additional children six ~~(6)~~ years of age and older who are enrolled in the first grade or above. The child-to-provider ratio shall be no more than six ~~(6)~~ children per provider.

A large Family Child Care Home provides care for no more than a total of ~~12~~ ~~twelve~~ ~~(12)~~ children less than 18 years of age, with no more than three ~~(3)~~ children under ~~2 1/2~~ ~~two and one half~~ ~~(2-1/2)~~ years of age. There shall be a minimum of two providers.

Section R202, **TOWNHOUSE UNIT**, is replaced as follows:

~~**TOWNHOUSE.** A single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from foundation to roof and has a yard or public way on the full length of one of the four principal sides and has a yard or public way on at least 50 percent of the length of another principal side.~~

TOWNHOUSE UNIT. A single-family dwelling unit in a done that extends from foundation to roof and that has a yard or public way on the full length of one of the four principal sides and has a yard or public way on at least 50 percent of the length of another principal side.

Section R202, **FIRE SEPARATION DISTANCE**, is replaced as follows:

FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior lot line.
2. To the center of a street, alley, or public way.
3. To an imaginary line between two buildings or townhouse units on the lot.

The distance shall be measured at a right angle from the face of the wall.

Commented [MOU3]: There is a new definition and term "townhouse unit" that took some of the characteristics contained in the previous "townhouse" definition. It appears more appropriate now to add the intent of Denver's amendment (a partial exposed side) to the townhouse unit definition.

Commented [MOU4]: A townhouse is a building (which is already in the IRC definition). I believe the purpose of this amendment was to address a line between two units in a single townhouse building. The 2021 IRC added a definition for townhouse units, that appears to fit better in this amendment and the amendments to R302.1.1

CHAPTER 3 BUILDING PLANNING

SECTION R301 DESIGN CRITERIA

Table R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA, and footnotes, is replaced as follows:

TABLE R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD	WIND DESIGN				SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP	ICE BARRIE UNDER-LAYMENT REQUIRED	FLOOD HAZARDS	AIR FREEZIN INDEX	MEAN ANNUAL TEMP
	Speed (mph)	Topographic effects	Special wind region ^b	Wind-borne debris zone		Weathering ^a	Frost line depth	Termite					
35 psf	115/125/140	No	Yes	No	B	Severe	36 inches	Slight/Mod	1° F	No	1978	712	40-45
MANUAL J DESIGN CRITERIA													
Elevation		Altitude correction factor		Coincident wet bulb		Indoor winter design dry-bulb temperature		Outdoor winter design dry-bulb temperature		Heating temperature difference			
5,285 feet		0.85		60° F		70° F		3° F		67° F			
Latitude		Daily range		Indoor summer design relative humidity		Indoor summer design dry-bulb temperature		Outdoor summer design dry-bulb temperature		Cooling temperature difference			
40° N		High		50%		75° F		91° F		16° F			

a. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C73, C 90, C129, C 145, C216 or C652.
b. See Section 1609 of the *International Building Code* for additional information.

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Section R302.1 Exterior walls is replaced in its entirety as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of *exterior walls* of *dwelling*s, *townhouse units* and accessory buildings shall comply with Table R302.1(1); or *dwelling*s and *townhouse units* equipped throughout with an *automatic sprinkler system* installed in accordance with Section **R313.2 P2904** shall comply with Table R302.1(2).

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory structures* located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempt from permits are not required to provide wall protection based on the location on the *lot*. Projections beyond the *exterior wall* shall not extend over the *lot line*.

4. Detached garages accessory to a *dwelling* or *townhouse* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.
6. Where the zoning ordinance establishes a minimum ~~ten-foot~~ ten-foot clear separation distance between the exterior walls of adjacent one- and two-family *dwelling*s located on separated properties and allows one building to be closer to actual *lot line* ~~property line~~ than the other, the imaginary line provision of Section 705.3 of the *International Building Code* may be used. The exterior wall shall not be located less than three feet to the actual *lot line* ~~property line~~.

The location of the assumed imaginary line with relation to both buildings shall be such that the exterior wall, openings, projections and penetrations meet the criteria set forth in Section R302.1.

Section R302.1.1 Townhouse unit imaginary lines is added as follows:

R302.1.1 Townhouse unit imaginary lines. For the purposes of determining *fire separation distance* and requirements of Section R302.1, *townhouse* units shall have assumed imaginary lines established. Assumed imaginary lines shall begin at the ends of the walls separating *townhouse* units required by Section R302.2 and shall extend to a *lot line* or to another imaginary line.

Section R302.2.2 is replaced in its entirety as follows:

~~**R302.2.2 Common walls.** Common wall separating *townhouse* units shall be assigned a fire resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouses* units shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water filled fire sprinkler piping, in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 and 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.~~

- ~~1.—Where a fire sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.3 of the *International Building Code*.~~
- ~~2.—Where a fire sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.3 of the *International Building Code*.~~

~~**Exception:** Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two two-inch nominal thickness wood studs.~~

**SECTION R305
CEILING HEIGHT**

Section R305.1 Minimum height is amended by adding Exception 5 ~~Exception 4~~.

Exceptions:

5. The ceiling height in basements built prior to October 1990 shall be a minimum of 6 feet 8 inches, with a minimum clearance of 6 feet 4 inches to any ceiling projection caused by beams, ducts, or pipes.

Commented [MOU5]: Recommend using common and defined terminology, unless there is a specific reason "property line" must be used.

Commented [MOU6]: New definition in the 2021 IRC meant to clarify when a townhouse as the whole building is the subject, or a dwelling unit within a townhouse. Here is the new definition:

[RB] TOWNHOUSE UNIT. A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.

Commented [MOU7]: With the change to townhouse units, and this sentence in the 2021 IRC, this section R302.2.2 would be identical to the IRC.

Commented [MOU8]: There is a new exception 4 in the 2021 IRC. This will need to be pushed to number 5.

Section R305.1.1 Basements is amended by replacing the Exception as follows:

Exception: At beams, girders, ducts, stair headroom, and other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.

SECTION R310

EMERGENCY ESCAPE AND RESCUE OPENINGS

Section R310.2.2 Window sill height is replaced in its entirety as follows:

~~**R310.2.2 Window net clear opening height.** Where a window is provided as the emergency escape and rescue opening, the bottom of the net clear opening shall be not more than 44 inches above the floor. Where the bottom of the net clear opening is below grade, it shall be provided with a window well in accordance with Section R310.2.3~~

SECTION R310

EMERGENCY ESCAPE AND RESCUE OPENINGS

Section ~~R310.2.2~~ R310.2.3 Maximum height from floor Window sill height is replaced in its entirety as follows:

~~**R310.2.3 Maximum height from floor R310.2.2 Window net clear opening height.** Emergency escape and rescue openings shall have the bottom of the net clear opening not greater than 44 inches (1118 mm) above the floor. Where a window is provided as the emergency escape and rescue opening, the bottom of the net clear opening shall be not more than 44 inches above the floor. Where the bottom of the net clear opening is below grade, it shall be provided with a window well in accordance with Section R310.2.3~~

Section R310.4 Area wells is replaced in its entirety as follows:

~~**R310.4 Area wells.** An emergency escape and rescue opening where the bottom of the net clear opening is below the adjacent grade shall be provided with an area well in accordance with Sections R310.4.1 through R310.4.4~~

SECTION R312

GUARDS AND WINDOW FALL PROTECTION

Section R312.1.2 Height is amended by adding the following sentence:

Required guards at open-sided walking surfaces located greater than 72 inches above finished grade shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface, above any integral or built in, abutting raised horizontal surface, or the line connecting the nosings.

Section R313 Automatic fire sprinkler systems is replaced in its entirety as follows:

SECTION R313

AUTOMATIC FIRE SPRINKLER SYSTEMS

~~**R313.1 Townhouses automatic sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses units where a habitable attic is being constructed above the third story above grade plane.~~

Commented [MOU9]: Reorganization of this section in 2021 IRC.

Commented [MOU10]: Denver has eliminated to prescriptive multi-purpose sprinkler provisions. However, P2904 is often referenced from other codes, such as the IBC. So P2904 is amended to simply point back to this section 313 for sprinkler requirements.

However, a few IBC sections point specific facilities built under the IRC to have sprinklers according to P2904. Those facilities are not addressed here, the final landing point for references. Thus the recommended language.

~~R313.2 One- and two-family dwellings automatic fire sprinkler systems. An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings where a habitable attic is being constructed above the third story above-grade plane.~~

R313.1 Lodging houses, care facilities, and medical and custodial care facilities. An automatic residential fire sprinkler system shall be installed in dwellings constructed under the International Residential Code as permitted in Sections 308.2.4, 308.3.2, 310.4.1, and 310.4.2 of the International Building Code.

~~R313.2~~ R313.3 Design and installation. Where required or provided, residential automatic fire sprinkler systems shall be designed and installed in accordance with NFPA 13D or NFPA 13R. Sprinkler system demand shall be satisfied by Denver Water’s site pressures without a fire pump.

Commented [MOU11]: This amended was included to two reasons. First, to require sprinklers for habitable attics above a third floor. That is now a requirement in R326.3 of the 2021 IRC.
However, the second was the language “is being constructed” and this was to address existing structures with attics above a third floor being modified into a habitable attic. That part of the amendment has not been addressed in the 2021 IRC.
However, it may be more appropriate to place that information in an amendment in R326
Commented [MOU12]: See comment above.

**SECTION R315
CARBON MONOXIDE ALARMS**

Section R315.1 General is amended by adding an exception:

Exception: Dwelling units described as being regulated by the *International Residential Code* in Sections 305.2.3, 308.2.4, 308.3, 308.5 or 310 of the *International Building Code*, shall comply with Section 915 of the *International Fire Code*.

Section R315.2.1 is amended by replacing Exception 1 as follows:

1. The dwelling unit contains a fireplace or other fuel-fired appliance.

Section R315.2.2 is amended by adding the following language to the end of the section and adding ~~Exception 3~~ Exception 4 as follows:

Installation of a fuel-fired appliance in the existing dwelling shall also require the dwelling unit to be equipped with carbon monoxide alarms located as required for new dwellings. CO alarms may be single-or multiple-station.

Exceptions:

- ~~3.~~ 4. Low power radio systems installed in accordance with NFPA 72, NFPA 720 and listed per UL 864 may be battery powered.

Commented [MOU13]: Denver to review. 305.2.3 allow E day care facilities to be built under IRC. 308.2.4 allows custodial care to be provided in dwellings built under the IRC. It may be an oversight that all other IBC occupancies with limits that allow construction under the IRC are included in this CO alarm amendment, except for these two.

Commented [MOU14]: A new exception 3 was added to the 2021.

Section R315.2.3 Family child care homes is added as follows:

R315.2.3 Family Child Care Homes. The installation of combination CO alarms and detectors within *Family Child Care Homes* shall comply with Section 915.5.3 of the *International Fire Code*. These devices shall be powered by 110 volts ~~440V~~ or battery-operated provided with permanent integral 10-year lithium batteries.

Section R315.3 Location is replaced in its entirety as follows:

R315.3 Location. Carbon monoxide alarms in dwelling units shall be installed outside of every sleeping area within 15 ~~feet~~ of the sleeping area doorway and in a central location on every occupiable level. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.

Section R315.6 Power Source is amended by adding Exception 3 as follows:

Exceptions:

3. Low power radio systems installed in accordance with NFPA 72, NFPA 720 and listed per UL 864 may be battery powered.

Section R315.8 Visual notification is added as follows:

R315.8 Visual notification. Visual notification shall be provided in *dwelling units* required to be accessible to persons with disabilities. Such device shall be listed in accordance with UL 1971 for *Safety and Signaling devices for Hearing Impaired*.

**[CRS] SECTION R320
ACCESSIBILITY**

Section R320.1 Scope is amended by adding the following sentences:

In addition to the requirements of this section, the provisions of the Colorado Revised Statute 9-5 shall be applicable. CRS 9-5 is reproduced in Appendix R of the Denver Amendments to the *International Building Code*.

**SECTION R326
HABITABLE ATTICS**

Section R326.5 Attic alterations is added as follows:

R326.5 Attic alterations. Where existing attics in dwelling units are located above the third story above grade plane and modified into habitable attics, a residential automatic fire sprinkler system shall be installed throughout the dwelling unit in accordance with Section R313.2.

Commented [MOU15]: Due to the changes to habitable attics above the third floor, the Denver amendment in 313 is no longer necessary. However, the amendment also addressed attic conversions. This section is suggested to handle that. The term "alterations" is used as that is an IRC defined term.

**SECTION ~~R326~~ R327
SWIMMING POOLS, SPAS AND HOT TUBS**

Section R326.1 General is replaced in its entirety as follows:

R327.1 ~~R326.1~~ General. The design and construction of swimming pools, spas and hot tubs shall comply with ~~the 2018 Denver Building and Fire Code Amendments to Appendix X of the International Residential Code, Appendix V.~~

Commented [MOU16]: I would avoid using dates in your ordinance when unnecessary.

CHAPTER 4 FOUNDATIONS

SECTION R401 GENERAL

[DOT] Section R401.1 Application is amended by adding the following sentence:

The Wastewater Management Division of the Department of Transportation and Infrastructure regulates the requirements for excavation, grading and earthwork construction, including fills and embankments.

Commented [MOU17]: editorial

Section R401.4 Soil tests **and all subsections are is** replaced in its entirety as follows:

R401.4 Soil tests. The classification of the soil at each building site shall be determined when required by the *building official*. The *building official* may require that this determination be made by an engineer or architect licensed by the state to practice as such.

R401.4.1 Investigation. The classification shall be based on observation and any necessary tests of the materials disclosed by borings or excavations made in appropriate locations. Additional studies may be necessary to evaluate soil strength, the effect of moisture variation on soil bearing capacity, compressibility, liquefaction, and expansiveness.

Exception: In lieu of a complete geotechnical evaluation and when accepted by the *building official*, the load-bearing values in Table R401.4.1 shall be assumed.

R401.4.2 Reports. The soil classification and design bearing capacity shall be shown on the plans, unless the foundation conforms to Table R403.1(1), R403.1(2), or R403.1(3), and Figure R403.1(1) or R403.1.3, as applicable. The *building official* may require submission of a written report of the investigation, which shall include, but need not be limited to the following information:

1. A plot showing the location of the test borings and/or excavations.
2. Description and classifications of the materials encountered.
3. Elevation of the water table, if encountered.
4. Recommendations for foundation type and design criteria, including bearing capacity, provisions to mitigate the effects of expansive soils, provisions to mitigate the effects of liquefaction and soil strength, and the effects of adjacent loads.
5. Expected total and differential settlement.

CHAPTER 7 WALL COVERING

SECTION R703 EXTERIOR COVERING

Section R703.1.3 Clearance above roof covering is added as follows:

R703.1.3 Clearances above roof covering. Where manufacturer's installation instructions do not provide clearances to roof coverings, the following clearances between wall covering and roof covering shall apply:

1. Minimum of 8 inches above roof coverings installed on roof slopes less than 2 units vertical in 12 units horizontal.
2. Minimum of 2 inches above roof coverings installed on roof slopes 2 units vertical in 12 units horizontal or greater.

CHAPTER 9 ROOF ASSEMBLIES

SECTION R903 WEATHER PROTECTION

Section R903.2.3 Flashing for single-ply roof systems is added as follows:

R903.2.3 Flashing for single-ply roof systems. All flashing installations for single-ply roofing systems shall be installed per manufacturer's latest recommendations and details for the system.

Section R903.2.4 Flashing for interior roof drains is added as follows:

R903.2.4 Flashing for interior roof drains. Flashing for interior roof drains shall be one of the following:

1. A minimum of 2 x 2 feet, 4-pound lead sheet or lead-copper coated sheet, set on completed felts in flashing cement. The metal shall be turned a minimum of ½ inch into a drain sump and plied with ~~2~~ **two** plies of Type 4 felt or modified bitumen membrane of sufficient dimension to extend a minimum of 6 inches past metal sheet.
2. A 2-component drain system. The membrane flashing shall be polyvinyl chloride sheet measuring 22 inches in length and factory-attached to the underside of the strainer flange. The membrane flashing shall be applied on top of the completed felt, shall extend a minimum of 6 inches from the outside diameter of the drain throat, shall be set into hot asphalt or *approved* sealants and plied in with ~~2~~ **two** plies of Type 4 felt.

Drain details for single-ply systems shall be installed ~~per~~ **in accordance with the** manufacturers' specifications.

Section R903.2.5 Vertical projections is added as follows:

R903.2.5 Vertical projections. All projections through the roof surface shall be properly flashed to prevent moisture entry.

1. Pipe penetrations shall be completed with a standard roof jack or manufacturer-recommended detail.
2. Pitch pans may be used to flash multiple penetrations with prior approval. Pourable sealer or sheet metal caps shall be used to seal pitch pans.

Section R903.2.6 Penetration of roof membrane is added as follows:

R903.2.6 Penetration of roof membrane. Exterior wall finishes such as, but not limited to, stucco and siding on walls extending above the roof shall terminate a minimum of 8 inches above the finished roofing of a flat roof and 2 inches above shingle, shake and tile roofs. Fasteners for exterior wall finished shall not penetrate the manufacturer's minimum required vertical upturn leg of the roofing membrane.

Section R903.4.2 Equipment on roof is added as follows:

R903.4.2 Equipment on roof. Equipment placed over roofing shall be supported by 8-inch legs or curbs bearing on the decking, which shall not inhibit the flow of water from the roof.

SECTION R905

REQUIREMENTS FOR ROOF COVERINGS

Section R905.2.8.2 Valleys item 3 is replaced in its entirety as follows:

2. For closed valleys (valley covered with shingles), valley lining of one ply of smooth roll roofing complying with ASTM D 6380 and not less than 36 inches wide (914 mm) or valley lining as described in Item 2 shall be permitted. Self-adhering polymer modified bitumen underlayment complying with ASTM D 1970 shall be permitted in lieu of the lining material.

Section R905.5.2 Deck slope is replaced in its entirety as follows:

R905.5.2 Deck slope. Mineral surfaced rolled roofing (90 lbs.) shall not be applied on roof slopes below 2 units vertical in 12 units horizontal.

Exception: Detached garages, patios and carports open on three sides may have a slope of 1 unit vertical in 12 units horizontal.

Section R905.9.4 Flashing – new built-up roof covering is added as follows:

R905.9.4 Flashing – new built-up roof covering. Flashing shall be installed on all vertical walls and curbs in accordance with the manufacturers' specifications and:

1. All old wall flashing shall be removed prior to installation of new flashing.
2. All flashings shall extend at least 8 inches, but not more than 12 inches, up all vertical surfaces and at least 4 inches from the base of the cant.
3. The top edges of the flashing shall be fastened at 3-inch intervals and sealed with plastic cement.
4. End laps shall be at least 3 inches long and covered with 4 inches of mesh embedded in plastic cement.
5. All vertical walls and projections shall be counterflashed with a 2-piece metal system installed watertight.
6. Nailers strips shall be provided on vertical walls, drips in edge and curbs which will not accept conventional nailing.

CHAPTER 11 ENERGY EFFICIENCY

SECTION N1101

SCOPE AND GENERAL REQUIREMENTS

Section N1101.3 Compliance materials is amended by adding the following sentences at the end:

The results from a code compliant software program can be utilized to show compliance. REScheck™ – Residential Energy Code Compliance Software – is one program currently being accepted. This program developed by the Department of Energy can be downloaded for free at <http://www.energycodes.gov/rescheck>.

Section N1101.6 (R202) Defined terms is amended by adding or replacing the following definitions:

~~**DWELLING UNIT ENCLOSURE AREA.** The sum of the area of the ceiling, floors, and walls separating a dwelling unit's conditioned space from the exterior or from adjacent conditioned or unconditioned spaces. Wall height shall be measured from the finished floor of the dwelling unit to the underside of the floor above.~~

ELECTRIC VEHICLE (EV). A vehicle registered for on-road use, primarily powered by an electric motor that draws current from a rechargeable storage source that is charged by being plugged into an electrical current source. Plug-in hybrid electric vehicles are electric vehicles having a second source of motive power.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). Equipment used for the purpose of transferring electric energy to a battery or other energy storage device in an *electric vehicle*. There are two different standardized levels that are currently in use at which an *electric vehicle's* battery is recharged, identified as Level 1 and Level 2.

LEVEL 1. (slow charging) Capable of charging at 20Amps maximum on a 120VAC, single phase branch circuit. *Approved* Level 1 connectors include the standard 120V grounded outlets (NEMA 5-15, 5-20) and SAE J1772 EV plug.

LEVEL 2. (accelerated charging) Capable of charging at 40Amps or higher on a 208V or 240VAC, single phase branch circuit. An EVSE capable of simultaneously charging at 40Amps or higher for each of two vehicles shall be counted as two Level 2 EVSE.

Level 2 connectors shall possess at a minimum an SAE J1772 EV plug. Other Level 2 EVSE connector types will not be restricted if listed or field-certified by an OSHA-approved testing lab and SAE certified.

ELECTRIC VEHICLE LOAD MANAGEMENT SYSTEM. These systems (also known as 'smart charging', 'power sharing', or 'load sharing') are technologies that allow multiple *electric vehicles* to charge simultaneously while not exceeding the capacity of an *electric vehicle*.

ELECTRIC VEHICLE (EV) CAPABLE SPACE. Electric Vehicle Capable Spaces are designated parking spaces where a basic level of infrastructure is installed to accommodate future *electric vehicles*.

ELECTRIC VEHICLE (EV) READY SPACE. Electric Vehicle (EV) Ready Spaces are designated parking spaces where the EVSE infrastructure has been installed and is made ready for *electric vehicle* charging.

GROUP R. Buildings or portions of buildings that contain any of the following occupancies as established in the *International Building Code*:

1. Group R-1.
2. Group R-2.
3. Group R-4 where located more than three stories in height above grade plane.

LEVEL 3 ALTERATION. Alterations where the work area exceeds 50 percent of the original building area or more than 10 parking spaces are substantially modified.

RESIDENTIAL BUILDING. For this code, includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and Group R-3 and R-4 buildings three stories or less in height above grade plane.

TOWNHOUSE. A single-family *dwelling unit* constructed in a group of three or more attached units in which each unit extends from foundation to roof and has a *yard* or public way on the full length of one of the four principal sides and has a *yard* or public way on at least 50% of the length of another principal side.

~~**HIGH EFFICACY LIGHT SOURCES.** Compact fluorescent lamps, light-emitting diode (LED) sources, T-8 or smaller diameter linear fluorescent lamps, or other lamps or light sources with an efficacy of not less than 65 lumens per watt.~~

~~**HISTORIC BUILDING.** Any building or structure that is one or more of the following:~~

- ~~1. Listed, or certified as eligible by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.~~
- ~~2. Designated as historic under an applicable state or local law.~~
- ~~3. Certified as a contributing resource within a National Register listed, state designated or locally designated historic district.~~

~~**ON-SITE PARKING SPACE.** Interior or exterior area on lot on the lot with minimum dimensions of 8.5 feet by 17.5 feet provided with an all-weather surface of asphalt, asphaltic concrete, concrete, crushed aggregate, or similar material and accessible by a vehicle from a public way.~~

Commented [DE18]: not in IECC amendments

Section N1101.11 (R303.2) Installation is replaced as follows:

N1101.11 (R303.2) Installation. Materials, systems, and equipment shall be installed in accordance with the manufacturer's instructions. Insulation shall be to minimum Grade I installation in accordance with RESNET/ICC 301 and the *International Building Code* or the *International Residential Code*, as applicable.

~~**Section N1101.13 (R401.2) Compliance is replaced as follows:**~~

- ~~1. Sections N1101.14 (R401) through N1104 (R404). Construction of new residential building using this option shall also comply with Section N1112 (R407).~~
- ~~2. Section N1105 (R405) and the provisions of Sections N1101.14 (R401) through N1104 (R404) indicated as "Mandatory."~~
- ~~3. The energy rating index (ERI) approach in Section N1106 (R406).~~

~~The results from a code-compliant software program can be utilized to show compliance. REScheck™.~~

~~Residential Energy Code Compliance Software is one program currently being accepted. This program developed by the Department of Energy can be downloaded for free at <http://www.energycodes.gov/rescheck>.~~

Section N1101.14 (R401.3) Certificate (Mandatory) is replaced and subsections are added as follows:

R401.3 Documentation (Mandatory). The documents in Section R401.3.1 and R401.3.2 shall be required.

~~**R401.3.1 Certificate.** A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room or an approved location inside the building. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall indicate the predominant R-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, basement walls, crawl space walls and floors and ducts outside conditioned spaces; U factors of fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing performed on the building. Where there is more than one value for each component, the certificate shall indicate the value covering the largest area. The certificate shall indicate the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric base board heaters.~~

N1101.14.2 (R401.3.1.2) Homeowner manual. The builder or owner's agent shall provide the owner with a binder of all equipment and appliance manufacturers' installation manuals, except for manuals that are required to be affixed to the equipment, and any information required to be included on the permanent certificate in accordance with R401.3.1. This includes any energy assessment report and/or ERI certificate.

SECTION N1102 (R402) BUILDING THERMAL ENVELOPE

Section N1102.1 (R402.1) General is replaced in its entirety as follows:

~~**N1102.1 (R402.1) General (Prescriptive)** The building thermal envelope shall meet the requirements of Sections N1102.1.1 through N1102.1.5.~~

~~Exceptions:~~

~~The following low energy buildings, or portions thereof, separated from the remainder of the building by building thermal envelope assemblies complying with this section shall be exempt from the building thermal envelope provisions of Section N1102 (R402):~~

- ~~1. Those with a peak design rate of energy usage less than 3.4 Btu/h-ft² (10.7 W/m²) or 1.0 watt/ft² of floor area for space conditioning purposes.~~
- ~~2. Those that do not contain conditioned space.~~
- ~~3. Log homes designed in accordance with ICC 400.~~

Section N1102.2.3 (R402.2.3) Eave baffle title is amended as follows:

~~**N1102.2.3 (R402.2.3) Eave baffle (Mandatory)**~~

Commented [ro19]: All of R401.3.1 Certificate is in the 2021 IECC

Remainder of section is unchanged

Section N1102.2.8 (R402.2.8) Floors is replaced as follows:

N1102.2.8 (R402.2.8) Floors. Floor cavity insulation shall comply with one of the following:

- ~~1. Insulation shall be installed to maintain permanent contact with the underside of the subfloor decking in accordance with manufacturer instructions to maintain designed loft or readily fill the available cavity space.~~
- ~~2. Floor framing cavity insulation shall be permitted to be in contact with the topside of sheathing separating the cavity and the unconditioned space below. Insulation shall extend from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.~~
- ~~3. A combination of cavity insulation and continuous insulation shall be installed so that the cavity insulation is in contact with the topside of the continuous insulation that is installed on the underside of the floor framing separating the cavity and the unconditioned space below. The combined R-value of the cavity insulation and continuous insulation shall equal the required R-value for floors. Insulation shall extend from the bottom to the top of all perimeter floor framing members and the framing members shall be air sealed.~~

Section N1102.4.1.2 (R402.4.1.2) Testing is replaced in its entirety as follows:

N1102.4.1.2 (R402.4.1.2) Testing The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding three air changes per hour or 0.16 CFM per (ft²) of dwelling unit enclosure area in climate zone 5. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the code official, testing shall be conducted by an approved agency. 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 be performed after all penetrations of the building thermal envelope ~~are in place have been sealed.~~

Exception: When testing individual dwelling units, and air leakage rate not exceeding four air changes per hour or 0.22 cfm per ft² of the dwelling unit enclosure area, tested in accordance with RESNET/ICC 380, ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals) shall be permitted for:

1. Attached one- and two-family dwelling units and townhouses.
2. Buildings or dwelling units that are 1000 square feet or smaller.
3. Rx occupancies built in accordance with Section 429 of the International Building Code.

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.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather-stripping 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, if installed at the time of the test, shall be open.
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and

sealed.

5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open.

SECTION N1103 (R403) SYSTEMS

Section N1103.1.3 (R403.1.3) Continuously burning pilot lights is added as follows:

N1103.1.3 (R403.1.3) Continuously burning pilot lights. The natural gas systems and equipment listed below shall not be permitted to have continuously burning pilot lights:

1. Fan-type central furnaces.
2. Household cooking appliances.

Exception: Household cooking appliances without electrical supply voltage connections and in which each pilot light consumes less than 150 Btu/hr.

3. Pool heaters.
4. Spa heaters.
5. Fireplaces.

~~Section N1103.3.1 (R403.3.1) Insulation (Prescriptive) is replaced as follows:~~

~~**N1103.3.1 (R403.3.1) Insulation (Prescriptive).** Supply and return ducts located outside conditioned space shall be insulated to an R-value of not less than R-8 for ducts 3 inches (76 mm) in diameter and larger and not less than R-6 for ducts smaller than 3 inches (76 mm) in diameter.~~

Section N1103.3.3 (403.3.5.3) Duct testing (Mandatory) is replaced as follow:

N1103.3.3 (403.3.5.3) Duct testing (Mandatory). The duct work in a building or dwelling unit shall be pressure tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554 for air leakage. The maximum total leakage rate for duct in any building or dwelling unit under any compliance path shall not exceed 6.0 cubic feet per minute (169.9 L/min) per 100 square feet (9.29 m²) of conditioned floor area served, (6cfm/100sqft), when the air handler is installed at the time of the test. When 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; (3cfm/100sqft). Registers shall be taped or otherwise sealed during the test. Testing shall be conducted at the rough-in stage or post-construction 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. Registers shall be taped or otherwise sealed during the test.
2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Alternatively, a duct leakage test to outside conditioned space with a pressure differential of 0.1 w.g. (25 Pa) with reference to the outside across the entire system including the manufacturers' air handler may be performed. Registers shall be taped or otherwise sealed during the test.

Exceptions:

1. 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.
2. If the HVAC duct system is serving less than or equal to 1,200 square feet of conditioned floor area, the allowable duct leakage shall be 72 cubic feet per minute or less.

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

Section N1103.3.4 (R403.3.4 R403.3.6) Duct leakage (Prescriptive) is amended by adding item 3 and an exception

3. Where all ducts and air handlers are located entirely within the building thermal envelope, total leakage shall be less than or equal to 6.0 CFM (169.9 L/min) per 100 square feet (9.29 m²) of conditioned floor area.

Exception: If the HVAC duct system is serving less than or equal to 1,200 square feet of conditioned floor area, the allowable duct leakage shall be 7.2 cubic feet per minute or less.

~~Section N1103.3.7 (R403.3.7) Ducts located in conditioned space is replaced as follows:~~

~~N1103.3.7 (R403.3.7) Ducts located in conditioned space. For ductwork to be considered as inside conditioned space it shall comply with one of the following:~~

- ~~1. The duct system shall be located completely within the continuous air barrier and within the building thermal envelope.~~
- ~~2. Ductwork in ventilated attic spaces shall be buried within ceiling insulation in accordance with Section R403.3.6 and all of the following conditions shall exist:

 - ~~2.1. The air handler is located completely within the continuous air barrier and within the building thermal envelope.~~
 - ~~2.2. The duct leakage, as measured either by a rough-in test of the ducts or a post-construction total system leakage test to outside the building thermal envelope in accordance with Section R403.3.4, is less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of conditioned floor area served by the duct system.~~
 - ~~2.3. The ceiling insulation R-value installed against and above the insulated duct is greater than or equal to the proposed ceiling insulation R-value, less the R-value of the insulation on the duct.~~~~
- ~~3. Ductwork in floor cavities located over unconditioned space shall comply with all of the following:

 - ~~3.1. A continuous air barrier installed between unconditioned space and the duct.~~
 - ~~3.2. Insulation installed in accordance with section R402.2.8.~~
 - ~~3.3. A minimum R-19 insulation installed in the cavity width separating the duct from unconditioned space.~~~~
- ~~4. Ductwork located within exterior walls of the building thermal envelope shall comply with the following:

 - ~~4.1. A continuous air barrier installed between unconditioned space and the duct.~~
 - ~~4.2. Minimum R-10 insulation installed in the cavity width separating the duct from the outside sheathing.~~~~

4.3. The remainder of the cavity shall be fully insulated to the drywall side.

Table N1103.6.1 (R403.6.1) is replaced as follows:

TABLE N1103.6.1 (R403.6.1)
MECHANICAL VENTILATION SYSTEM FAN EFFICACY*

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY (CFM/WATT)	AIR FLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	3.8 cfm/watt	Any
Bathroom, utility room	10	2.8 cfm/watt	<90
Bathroom, utility room	90	3.5 cfm/watt	Any

a. When tested in accordance with HVI Standard 916

Section N1103.10.1 (R403.10.1) Heaters is replaced as follows:

N1103.10.1 (R403.10.1) Heaters. The electric power to heaters shall be controlled by a readily accessible on-off switch that is an integral part of the heater mounted on the exterior of the heater, or external to and within 3 feet (914 mm) of the heater. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater.

SECTION N1104 (R404)

ELECTRICAL POWER AND LIGHTING SYSTEMS

Section N1104.1 (R404.1) Lighting equipment (Mandatory) is replaced as follows:

~~**N1104.1 (R404.1) Lighting equipment (Mandatory).** Not less than 90 percent of the permanently installed luminaires shall be, or contain, only high-efficacy light sources.~~

Section N1104.1.2 (R404.1.2) Building grounds lighting efficacy is added as follows:

~~**N1104.1.2 (R404.1.2), Building grounds lighting efficacy.** Connected exterior lighting for Group R-3 and R-4 buildings shall comply with Section C405.4 of the *International Energy Conservation Code*—Commercial Provisions.~~

~~Exceptions:~~

- ~~1. Solar powered lamps not connected to any electrical service.~~
- ~~2. Luminaires controlled by a motion sensor.~~

Section N1104.24 (R404.4.2) Group R Occupancy *Electric Vehicle (EV)* charging requirements for new construction and level 3 alterations and subsections are added as follows:

N1104.24 (R404.4.2) Group R Occupancy *Electric Vehicle (EV)* charging spaces for new construction and level 3 alterations (Mandatory). Electric vehicle charging shall be provided and installed in accordance with this section and the *National Electrical Code (NFPA 70)*. When parking spaces are added

or modified without an increase in building floor area or a *level 3 alteration*, only the new parking spaces are subject to this requirement.

N1104.24.1 (R404.4.12.2) Group-R occupancies. Group-R occupancies ~~(All R-3 buildings and R-4 buildings three stories and less) with three or more dwelling units and/or sleeping units~~ shall be provided with electric vehicle charging in accordance with Table **R404.4.1 2.2**.—Calculations for the number of parking spaces shall be rounded up to the nearest whole number.

The minimum required quantity of EV parking spaces shall be calculated based upon the total provided new and existing parking spaces for the building. A minimum of 70% of the required EV parking spaces shall be amongst the 50% of parking spaces located closest to the intended occupant entrance to the building served.

N1104.24.2 (R404.4.2.2) Accessible parking. Where new accessible parking space(s) are provided, parking facilities shall be designed so that at least one accessible parking space shall be an *EV ready space* or *EVSE installed space*. The accessible parking space shall be included in the total EV parking spaces as required in Table **R404.4.1 2.2**.

N1104.5 (R404.5 R404.3) One- and Two-Family Dwellings and Townhouses *Electric Vehicle (EV) charging requirements and subsections are added as follows:*

N1104.5 (R404.5 R404.3) One- and Two-Family Dwellings and Townhouses *Electric vehicle (EV) charging requirements (Mandatory):* *Electric vehicle* charging shall be provided and installed in accordance with this section and the National Electrical Code (*NFPA 70*).

Exception: The number of *electric vehicle ready spaces* per lot shall not be required to exceed one *electric vehicle ready space* per *dwelling unit* on that lot.

R404.5.1 R404.3.1 (N1104.5.1 N1104.2.1) *Electric vehicle (EV) ready spaces for new dwelling units.* Each new *dwelling unit* with *on-site parking spaces* shall be provided with a minimum of one *electric vehicle ready space*.

R404.5.2 R404.3.2 (N1105.2 N1104.2.2) *Electric vehicle (EV) ready spaces for new garages and carports.* Each new garage and/or carport with *on-site parking spaces* shall be provided with a minimum of one *electric vehicle ready space*.

R404.5.3 R404.3.3 (N1105.3 N1104.2.3) *Electric vehicle (EV) ready spaces for new on-site parking spaces.* Each new *on-site parking space* shall be provided with a minimum one *electric vehicle ready space*.

R404.5.4 R404.3.4 (N1104.5.4 N1104.2.4) Minimum EV Ready Space infrastructure shall require the following:

1. Installation of conductors.
 - a. Conductors shall be installed of sufficient size to accommodate a 120VAC 20Amp branch circuit to each parking space where required.
 - b. Conductors shall terminate in either
 - i. a 20Amp NEMA receptacle or SAE J1772 EV plug.
 - ii. a junction or outlet box that is capped off and the cap labeled as 'EV Ready for Future Use'.
 - iii. an EVSE installed within the parking space.

Commented [ro20]: Policy Number IRCN1104.2 does not limit EV Charging stations to R3 & R4 occupancy and not for 3 or more dwelling units.

2. The circuit breakers and/or circuit breaker spaces reserved for the *electric vehicle ready spaces* shall be clearly identified on the panelboard. The branch circuit shall be identified as 'EV Ready' on the panelboard schedule, and the termination location shall be marked as 'EV Ready'

R404.5.5 R404.3.5 (N1104.5.5 N1104.2.5) Construction Documents. Construction documents shall graphically indicate and label all *EV ready spaces* and associated termination locations. For all IRC Townhouses and one- and two-family dwellings with an electrical utility service exceeding 200Amps, a panelboard schedule shall be provided indicating the EV Ready circuit breaker space(s) and the circuit designation(s).

TABLE R404.4.1 2.2

EV SPACES IN GROUP R OCCUPANCIES

	NUMBER OF LEVEL 2 EV READY SPACES	NUMBER OF LEVEL 2 EV CAPABLE SPACES	NUMBER OF LEVEL 2 EVSE INSTALLED SPACES
1 Space	1	None	None
2 to 9 spaces	1	20% of spaces	None
10 or more spaces	15% of spaces	Remainder of spaces	5% of spaces

N1104.6 (R404.4.3 R404.2.4) Electric Vehicle Supply Equipment (EVSE) Requirements.

N1104.6.1 (R404.4.3.1 R404.2.4.1) Level 2 charging.

1. Each *Level 2 EVSE* can have one or multiple connectors. It is permissible to serve multiple parking spaces with one *Level 2 EVSE* so long as the connectors can adequately reach each individual designated parking space.
2. *Level 2 EVSE* can be equipped with cellular, wired, or wireless communications.

N1104.7 (R404.4.4 R404.2.5) EV Space Infrastructure Requirements.

N1104.7.1 (R404.4.4.1 R404.2.5.1) EV Ready Spaces

1. Installation of infrastructure conduit.
 - a. The conduit shall be sized and installed per the National Electrical Code and shall be no less than 1" in size.
 - b. Conduits must be continuous from the future or existing panelboard or switchboard location(s) and end at a location allowing convenient, future installation of and access to the future *EVSE*.
2. Installation of conductors.
 - a. Conductors shall be installed of sufficient size to accommodate a minimum 40Amp branch circuit to each parking space where required in Table R404.2.2.
 - b. Conductors shall terminate in either
 - i. a minimum 40Amp NEMA receptacle or SAE J1772 EV plug.

- ii. a junction or outlet box that is capped off, with the conduit sealed and the cap labeled as 'EV Ready for Future Use'.
 - iii. an *EVSE* installed within the parking space.
- 3. Electrical service and distribution capacity.
 - a. Electrical loads for the EV Ready parking spaces shall be included in the utility service calculations when determining the required ampacity rating for the service equipment.
 - b. The electrical loads shall be based on the quantity of *EV Ready Spaces* and *EVSE Installed Spaces* as required in Table R404.2.2.
- 4. Panelboard space.
 - a. There shall be adequate reserved circuit breaker space in an electrical panelboard or reserved space within an electrical switchboard to meet the requirements of Table R404.2.2.
 - b. This is in addition to the quantity of required *EVSE Installed Spaces* circuit breakers or fused switches to meet the requirements of Table R404.2.2.

~~N1104.7.2 (R404.4.4.2 R404.2.5.2)~~ EV Capable Spaces.

1. Installation of infrastructure conduit.
 - a. The conduit shall be sized and installed per the National Electrical Code and shall be no less than 1" in size.
 - b. Conduits must be continuous from the future or existing panelboard or switchboard location(s) and end at a location allowing convenient, future installation of, and access to, the future EVSE.
 - c. The *EV Capable Space* infrastructure conduit shall include installation of a pull rope or line for future conductor installation, with the conduit sealed and labeled as 'EV Capable for Future Use'.
 - d. At the termination where each conduit ends at a future *EVSE* location, the conduit shall be sealed at a junction or outlet box that is capped off, with the conduit sealed and the cap labeled as "EV Capable for Future Use".
2. Electrical distribution equipment room.
 - a. The electrical equipment room shall provide dedicated space for the future installation of the electrical distribution equipment required to serve the *EVSE*. Such equipment may include service switchgear, distribution panelboards, and transformers.
 - b. The future space shall be identified on all construction documents submitted for review and shall demonstrate compliance with the requirements of the National Electrical Code.
3. The space shall not be used for any other permanent purposes so as not to restrict future installation of electrical equipment.

SECTION (R406)

ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

~~Section N1106.2 (R406.2) Mandatory requirements is replaced as follows (exception remains unchanged):~~

~~**N1106.2 (R406.2) Mandatory requirements.** Compliance with this section requires that the provisions identified in Sections (R401) through (R404) indicated as "Mandatory" and Section R403.5.3 be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficients in Table 402.1.2 or 402.1.4 of the 2015 *International Energy Conservation Code*.~~

Table N1106.4 (R406.4) Maximum energy rating index is replaced as follows, footnote a is deleted:

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

CLIMATE ZONE	ENERGY RATING INDEX
5	56

N1108 (R408) is added as follows:

SECTION N1108 (R408)

ADDITIONAL EFFICIENCY PACKAGE OPTIONS

N1108 (R408.2.6 R407.1.5) Improved air leakage. The measured air leakage rate shall be less than or equal to 2.0 air changes per hour as tested in accordance with the requirements of Section R402.4.1.2.

SECTION ~~N1107~~ N1109 (R501)

EXISTING BUILDINGS – GENERAL

Section N1109.4 (R501.4) Compliance is replaced in its entirety as follows:

~~**N1109.4 (R501.4) Compliance.** Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in this code and the *International Building Code, International Fire Code, International Fuel and Gas Code, International Mechanical Code, International Plumbing Code* and *NFPA 70*.~~

Section N1109.6 (R501.6) Historic buildings is amended as follows:

N1109.6 (R501.6) Historic buildings. No provision of this code relating to the construction, repair, alteration, restoration and movement of structures, and *change of occupancy* shall be mandatory for *historic buildings* provided that one of the following applies:

1. A report has been submitted to the *code official* and signed by the owner and a *registered design professional*, demonstrating that compliance with that provision would threaten, degrade or destroy the contributing historic character or features, or the historic form, materials or function of the building.
2. The State Historic Preservation Office having jurisdiction provides a letter to the *code official* with a finding that compliance with that provision would be in conflict with the Secretary of the Interior's Standards for Rehabilitation, outlining the specific provisions that are in conflict and how compliance would threaten, degrade, or destroy the contributing historic character or features, or the historic form, materials or function of the building.
3. The local historic preservation authority having jurisdiction provides documentation to the *code official* with a finding that compliance with that provision would be in conflict with locally adopted historic preservation policies, standards, and guidelines, outlining the specific provisions that are in conflict and how compliance would threaten, degrade or destroy the historic character or features, or the historic form, materials or function of the building.

Section 502 Additions is replaced in its entirety as follows:

SECTION N1110 (R502)

ADDITIONS

Section N1110.1 (R502.1) General is replaced as follows:

N1110.1 (R502.1) General. *Additions* to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. *Additions* shall not create an unsafe or hazardous condition or overload existing building systems. An *addition* shall be deemed to comply with this code where the addition alone complies using section R502.1.1, where the existing building and *addition* comply with this code as a single building, or where the building with the addition does not use more energy than the existing building. *Additions* shall be in accordance with Sections ~~R502.1.1~~**R502.3**, ~~R502.1.2~~ or R502.1.3.

Section N1110.1.1.1 (~~R502.1.1.1~~ **R502.3.1**) Building envelope is amended by adding Exception #2 as follows:

2. Where unconditioned space is changed to conditioned space, the air leakage rate of the *addition* shall comply where the air leakage rate, as determined in Section N1102.4.1.2, of the existing building, the addition and any alterations that are part of the project, is less than or equal to the air leakage rate of the existing building.

Section Existing plus addition compliance (Energy Rating Index Alternative) is added as follows:

N1110.1.3 (R502.1.3) Existing plus addition compliance (Energy Rating Index Alternative). Where *unconditioned space* is changed to *conditioned space*, the addition shall comply where the energy rating index score of the *addition* and the existing *building*, and any *alterations* that are part of the project, is less than or equal to the energy rating index of the existing *building* when modeled in accordance with Section N1106 (R406). The addition and any alterations that are part of the project shall comply with Section N1106 (R406) in its entirety.

Section N1112 (R407) is added as follows:

SECTION N1112 (R407)

ADDITIONAL EFFICIENCY PACKAGE OPTIONS

~~**N112.1 (R407.1) Requirements (Prescriptive).** Construction of new *residential buildings* shall comply with at least one of the following Sections:~~

- ~~1. Enhanced envelope performance in accordance with Section R407.1.1.~~
- ~~2. More efficient HVAC performance in accordance with Section R407.1.2.~~
- ~~3. High efficiency in service water heating in accordance with Section R407.1.3.~~
- ~~4. More efficient thermal distribution system in accordance with Section R407.1.4.~~
- ~~5. Improved air leakage in accordance with Section R407.1.5.~~
- ~~6. Lighting efficiency in accordance with Section R407.1.6.~~

~~**N112.1.1 (R407.1.1) Enhanced building thermal envelope performance.** The total *building thermal envelope* UA shall be less than or equal to 95 percent of the total UA as calculated per R402.1.5~~

~~**N112.1.2 (R407.1.2) More efficient HVAC equipment performance.** Heating and cooling equipment for each heating and cooling system shall meet or exceed at least one of the following efficiencies:-~~

- ~~1. Greater than or equal to 95 AFUE natural gas furnace and 15 SEER air conditioner.~~
- ~~2. Greater than or equal to 10 HSPF/15 SEER air source heat pump.~~
- ~~3. Greater than or equal to 3.5 COP ground source heat pump.~~

N1112.1.3 (R407.1.3) High efficiency in service water heating. Water heating equipment shall meet or exceed one of the following efficiencies:

- ~~1. Greater than or equal to .82 UEF fossil fuel service water heating system.~~
- ~~2. Greater than or equal to 2.0 UEF electric service water heating system.~~
- ~~3. Greater than or equal to 0.4 Solar Fraction solar water heating system.~~

N1112.1.4 (R407.1.4) More efficient thermal distribution system. The thermal distribution system shall meet or exceed at least one of the following:

- ~~1. 100 percent of ducts and air handlers shall be located entirely within the *building thermal envelope*.~~
- ~~2. 100 percent of ductless thermal distribution system or hydronic thermal distribution system shall be located completely inside the *building thermal envelope*.~~
- ~~3. 100 percent of duct thermal distribution system shall be located in *conditioned space* as defined by R403.3.7.~~

N1112.1.5 (R407.1.5) Improved air leakage. The measured air leakage rate shall be less than or equal to 2.0 air changes per hour as tested in accordance with the requirements of Section R402.4.1.2.

N1112.1.6 (R407.1.6) Lighting efficiency. Install 100% high efficacy lighting with a minimum 75 lumens/watt in 100% of spaces. Installed luminaires must be capable of meeting the recommended light levels for each given space type, per the IESNA Lighting Handbook.

CHAPTER 25 PLUMBING ADMINISTRATION

SECTION P2503 INSPECTION AND TESTS

Section P2503.5.1 Rough plumbing is replaced in its entirety as follows:

P2503.5.1 Rough Plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, plastic pipe shall be tested in accordance with the State of Colorado *International Residential Code* amendments, by air, without evidence of leakage. Either test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than ~~10 feet~~ 5-feet (1524 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes.
3. Vacuum test. The portion under test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of negative 5 pounds per square inch or a negative 10 inches of mercury column (-34 kPa). This pressure shall be held without the removal of additional air for a period of 15 minutes.

Commented [MOU21]: This was reduced in the 2015 IRC to 5 feet and then put back to 10 feet in the 2021.

Commented [MOU22]: This is a new option in the 2021 IRC. The only changed in this Denver amendment is the reference to the Colorado amended code for plastic pipe air tests, therefore I have added the change from the 2021.

CHAPTER 26 GENERAL PLUMBING REQUIREMENTS

SECTION P2602

INDIVIDUAL WATER SUPPLY AND SEWAGE DISPOSAL

Section P2602.3 Existing buildings is added as follows:

P2602.3 Existing buildings. Plumbing in existing buildings may have their use continued if such use was legally permitted at the time of enforcement of the Plumbing Code in effect at the time of construction and such use is not detrimental to the health and safety of the occupants for the current use or occupancy.

Any change in the use or occupancy of any existing building or structure shall comply with the provisions of this Code. Deviations may be *approved* by the *building official* if they are determined to not be detrimental to the health and safety of the occupants of the use or occupancy.

Section P2603.5.1 Sewer depth is replaced in its entirety as follows:

P2603.5.1 Sewer depth. Building sewers that connect to a private sewage disposal system shall be installed at a depth in accordance with Denver Wastewater Management Standards.

SECTION P2604

TRENCHING AND BACKFILLING

Section P2604.5 Trench safety is added as follows:

P2604.5 Trench safety. All excavations shall follow OSHA guidelines and/or requirements of this Code. The most restrictive rules shall apply.

CHAPTER 27
PLUMBING FIXTURES

SECTION P2716
FOOD-WASTE DISPOSER

Section P2716.1 Food-waste disposer waste outlet is replaced in its entirety as follows:

P2716.1 Food-waste disposer waste outlet. Food waste disposers with a waste outlet of 1 ½ inches (38 mm) in diameter shall be connected to a drain of not less than 2 inches (51 mm) in diameter.

CHAPTER 28 WATER HEATERS

SECTION P2801

GENERAL

Section P2801.6.1 Pan size and drain is replaced in its entirety as follows:

P2801.6.1 Pan size and drain. The pan shall not be less than 1 ½ inches (38mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe of not less than ¾ inches (19mm) diameter. Piping for safety pan drains shall be of those materials indicated in Table P2906.5.

CHAPTER 29 WATER SUPPLY AND DISTRIBUTION

SECTION P2904

DWELLING UNIT FIRE SPRINKLER SYSTEMS

Section P2904.1 General is replaced in its entirety as follows:

P2904.1 General. Residential fire sprinkler systems shall be designed and installed in accordance with Section ~~R313.2~~ ~~R313.3~~ of the *International Residential Code*.

Remaining sections of Section P2904 are deleted in entirety.

SECTION P2906

MATERIALS, JOINTS AND CONNECTIONS

Section 2906.4 Water service pipe is replaced in its entirety as follows, though the subsection remains:

2906.4 Water service pipe. Water service pipe shall conform to NSF 61 and shall conform to Denver Water Engineering Standards. Water service pipe or tubing, installed underground and outside of the structure, shall have a working pressure rating of not less than 160 pounds per square inch at 73°F (1103 kPa at 23°C). Where the water pressure exceeds 160 pounds per square inch (1103 kPa), piping material shall have a rated working pressure equal to or greater than the highest available pressure. Water service piping materials not third-party certified for water distribution shall terminate at or before the full open valve located at the entrance to the structure. Ductile iron water service piping shall be cement mortar lined in accordance with AWWA C104/A21.4.

CHAPTER 30 SANITARY DRAINAGE

SECTION P3003 JOINTS AND CONNECTIONS

Section P3003.9.2 Solvent cementing is replaced as follows:

Solvent cementing. Joint surfaces shall be clean and free from moisture. A purple primer that conforms to ASTM F 656 shall be applied. Solvent cement not purple in color and conforming to ASTM D 2564, CSA B137.3 or CSA B181.2 shall be applied to all joint surfaces. The joint shall be made while the cement is wet and shall be in accordance with ASTM D 2855. Solvent-cement joints shall be installed above or below ground.

SECTION P3005 DRAINAGE SYSTEM

Section P3005.2.3 Building drain and building sewer junction is amended as follows:

P3005.2.3 Building drain and building sewer junction. The junction of the building drain and the building sewer shall be served by a cleanout in accordance with Denver Wastewater Management Standards.

Section P3005.2.4 Changes of direction is amended as follows:

P3005.2.4 Changes of direction. Where a horizontal drainage pipe, or a building drain has a change of horizontal direction greater than 135 degrees (2.36 rad), a cleanout shall be installed at the change of direction. Where more than one change of direction occurs in a run of piping, only one cleanout shall be required for each 40 feet (12 192 mm) of developed length of piping.

CHAPTER 31 VENTS

SECTION P3103 VENT TERMINALS

Section P3103.1.1 Roof extension is replaced in its entirety as follows:

P3103.1.1 Roof extension. Open vent pipes that extend through a roof that do not meet the conditions of Section P3103.1.2 or P3103.1.3 shall terminate not less than 12 inches above the roof.

SECTION P3111 COMBINATION WASTE AND VENT SYSTEMS

Section P3111.1 Type of fixture is amended by adding the following sentence:

A combination waste and vent system shall not receive the discharge of a food waste disposer.

SECTION P3114 AIR ADMITTANCE VALVES

Section P3114.8 Prohibited installations is replaced in its entirety as follows:

P3114.8 Prohibited installations. Air admittance valves shall not be used to vent sumps or tanks. Air admittance valves shall not be installed on outdoor vent *terminals* for the sole purpose of reducing clearances to gravity or mechanical air intakes.

CHAPTER 34 GENERAL REQUIREMENTS

SECTION E3401 GENERAL

Section E3401.1 Applicability is amended by adding the following sentences:

All references within the ~~2018 2021~~ International Residential Code IRC to the ~~2017 2020~~ National Electrical Code shall be changed to reference 'the *National Electrical Code* (NEC) as adopted by the State of Colorado'. Any discrepancies between the referenced ~~2017 2020~~ National Electrical Code NEC and the state-adopted National Electrical Code NEC within the International Residential Code IRC Chapters 34 through 43 shall be resolved by applying the requirements of the *National Electrical Code* as adopted by the State of Colorado.

Commented [MOU23]: Editorial

CHAPTER 36 SERVICES

SECTION E3601

GENERAL SERVICES

Section E3601.2 Number of services is replaced in its entirety as follows:

E3601.2 Number of services. One- and two-family dwellings and any associated structures shall be supplied by one set of service entrance conductors, as defined in the *National Electrical Code*, whether overhead or underground, unless otherwise *approved* by the *building official*. (230.2).

**INTERNATIONAL RESIDENTIAL CODE APPENDICES
STATUS OF APPENDICES ON ADOPTION**

All Chapters and Sections of this Appendix are adopted as part of this Code except for those that are deleted in this summary. Those that are amended or added shall also be adopted as part of this Code. Appendices are Added, Adopted, Adopted as Amended, or Not Adopted as part of this Code as noted in Appendix Adoption Table 1 of the *International Residential Code*. Provisions in Appendices that are added, adopted, or adopted as amended carry the full weight and mandatory enforceability of the Code.

**TABLE 1
INTERNATIONAL RESIDENTIAL CODE APPENDIX ADOPTION**

APPENDIX	TITLE – SUBJECT	STATUS
AA	Sizing and Capacities of Gas Piping (IFGS)	Adopt as guideline Not Adopted
AB	Sizing of Venting Systems Serving Appliances Equipped with Draft Hoods, Category I Appliances, and Appliances Listed for Use with Type B Vents (IFGS)	Adopt as guideline Not Adopted
AC	Exit Terminals of Mechanical Draft and Direct-Vent Ventilating Systems (IFGS)	Adopt as guideline Not Adopted
AD	Recommended Procedures for Safety Inspection of an Existing Appliance Installation (IFGS)	Adopt as guideline Not Adopted
AE	Manufactured Housing Used as Dwellings (IBC)	Adopted as Amended
AF	Passive Radon Gas Controls	Adopted
AG	Piping Standards for Various Applications	Adopt as guideline Not Adopted
AH	Patio Covers	Adopted
AI	Private Sewage Disposal	Deleted Not Adopted
AJ	Existing Buildings and Structures	Deleted Not Adopted
AK	Sound Transmission	Adopted
AL	Permit Fees	Deleted Not Adopted
AM	Home Day Care – R-3 Occupancy	Adopted as Amended
AN	Venting Methods	Adopt as guideline Not Adopted
AO	Automatic Vehicular Gates	Adopt as guideline Not Adopted
AP	Sizing of Water Piping System	Adopt as guideline Not Adopted
AQ	Tiny Homes	Adopted
AR	Light Straw-Clay Construction	Adopted
AS	Strawbale Construction	Adopted
AT	Solar-Ready Provisions – Detached One- and Two-Family Dwellings, Multiple Single-Family Dwellings (Townhouses)	Adopted as guideline
AU	Cob Construction (Monolithic adobe)	Not Adopted
AV	Board of Appeals	Not Adopted
AW	3D-Printed Building Construction	Not Adopted

Commented [MOU24]: "Adopt as guideline" will no longer be an identification term.

<u>AU AX</u>	2018 International Swimming Pool and Spa Code Section 305, remainder of the 2018 International Swimming Pool and Spa Code is adopted into this appendix as a guideline	Adopted <u>as Amended</u>
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**APPENDIX AE
MANUFACTURED HOUSING USED AS DWELLINGS**

Appendix E Manufactured housing used as dwellings is replaced as follows:

The provisions of Section ~~3114~~ 3116 of the Denver Amendments to the International Building Code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use, and occupancy of Manufactured Homes.

APPENDIX AM HOME DAY CARE--R-3 OCCUPANCY

SECTION AM101 GENERAL

Appendix Section AM101.1 General is amended by adding the following sentence:

Floor levels two or more stories above the ground-level story shall not be used for child care.

SECTION AM103 MEANS OF EGRESS

Section AM103.1.4 Child care exits is added as follows:

AM103.1.4 Child care exits. A floor level used for child care that is no more than four (4) feet measured vertically from adjacent ground level, may be considered a complying ground-level story.

All rooms used for child care shall possess access to two exits. The primary exit access shall be a door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at finished ground level. The secondary exit access shall ~~be one of the following: (1) a door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at finished ground level that is independent of and remote from the primary exit access or, (2) an emergency escape and rescue opening conforming to the provisions of Section R310.2.~~

1. A door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at finished ground level that is independent of and remote from the primary exit access.
2. An emergency escape and rescue opening conforming to the provisions of Section R310.2.

There shall be no dead-end corridors exceeding 20 feet # in length.

In large *Family Child Care Homes* (FCCH), when the first level above the ground-level story is used for child care, the primary exit access shall be one of the following:

1. A door leading directly to the outside with access to finish ground level,
2. A door leading directly to an outside stairway going to finished ground level or,
3. An interior stairway leading directly to the outside with access to finished ground level. The interior stairway shall be separated from other stories by not less than ½-inch gypsum board or equivalent. The under-stair surface, including any intermediate landings shall be protected with ½-inch gypsum board or equivalent.

Section AM103.5 Large Family Child Care Homes protection of vertical openings is added as follows.

AM103.5 Large Family Child Care Home protection of vertical openings. For large *Family Child Care Homes*, a door equipped with a self-closing or automatic-closing device shall be provided between the first story and the basement at the top of all stairways. Where the story above the level of exit discharge is used for sleeping purposes, there shall be a door equipped with a self-closing or automatic-closing device at the top or the bottom of each stairway. In all locations these doors shall be a solid wood door not less than 1-3/8 inches (35 mm) in thickness, a solid or honeycomb-core steel door not less than 1-3/8 inches (35 mm) thick, or a 20-minute labeled fire door.

Commented [MOU25]: More appropriate formatting. No change to text.

Commented [MOU26]: Made italics

APPENDIX AT
SOLAR-READY PROVISIONS—DETACHED ONE- AND TWO-FAMILY
DWELLINGS AND TOWNHOUSES

SECTION AT103
SOLAR-READY ZONE

Section AT103.1 General and exceptions are replaced in entirety as follows:

AT103.1 General. New detached one-and two-family *dwelling*s and *townhouse* *units* with not less than 600 square feet (55.74 m²) of roof area oriented between 110 degrees and 270 degrees of true north, shall comply with Sections AT103.2 through AT103.10

Commented [MOU27]: The only change is adding the term "units" so that the roof area threshold applies to each unit and not the entire building.

This appendix has been cross referenced to Appendix RB in the 2021 IECC and baseline Denver code.

APPENDIX U X
2015 2021 INTERNATIONAL SWIMMING POOL AND SPA CODE

Section 305 of the 2021 ~~2018~~ International Swimming Pool and Spa Code is amended and added as follows:

SECTION 305

BARRIER REQUIREMENTS

305.1 General. The provisions of this section shall apply to the design of barriers for pools and spas. These design controls are intended to provide protection against the potential drowning and near drowning by restricting access to such pools or spas. These requirements provide an integrated level of protection against potential drowning through the use of physical barriers and warning devices.

Exceptions:

1. Spas and hot tubs with a lockable *safety cover* that complies with ASTM F 1346.
2. Swimming pools with a powered *safety cover* that complies with ASTM F 1346.

305.1.1 Construction fencing required. The construction sites for in-ground swimming pools an spas shall be provided with construction fencing to surround the site from the time that any excavation occurs up to the time that the permanent barrier is completed. The fencing shall be not less than 4 feet (1219 mm) in height.

305.2 Outdoor swimming pools and spas. Outdoor pools and spas and indoor swimming pools shall be surrounded by a barrier that complies with Sections 305.2.1 through 305.7.

305.2.1 Barrier height and clearances. Barrier heights and clearances shall be in accordance with all of the following:

1. The top of the barrier shall be not less than 48 inches (1219 mm) above grade where measured on the side of the barrier that faces away from the pool or spa. Such height shall exist around the entire perimeter of the barrier and for a distance of 3 feet (914 mm) measured horizontally from the outside of the required barrier.
2. The vertical clearance between grade and the bottom of the barrier shall not exceed 2 inches (51 mm) for grade surfaces that are not solid, such as grass or gravel, where measured on the side of the barrier that faces away from the pool or spa.
3. The vertical clearance between a surface below the barrier to a solid surface, such as concrete, and the bottom of the required barrier shall not exceed 4 inches (102 mm) where measured on the side of the required barrier that faces away from the pool or spa.
4. Where the top of the pool or spa structure is above grade, the barrier shall be installed on grade or shall be mounted on top of the pool or spa structure. Where the barrier is mounted on the top of the pool or spa, the vertical clearance between the top of the pool or spa and the bottom of the barrier shall not exceed 4 inches (102 mm).

305.2.2 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

305.2.3 Solid barrier surfaces. Solid barriers that do not have openings shall not contain indentations or protrusions that form handholds and footholds, except for normal construction tolerances and tooled masonry joints.

305.2.4 Mesh fence as a barrier. Mesh fences, other than chain link fences in accordance with Section 305.2.7, shall be installed in accordance with the manufacturer's instructions and shall comply with the following:

1. The bottom of the mesh fence shall be not more than 1 inch (25 mm) above the deck or installed surface or grade.
2. The maximum vertical clearance from the bottom of the mesh fence and the solid surface shall not permit the fence to be lifted more than 4 inches (102 mm) from grade or decking.
3. The fence shall be designed and constructed so that it does not allow passage of a 4-inch (102mm) sphere under any mesh panel. The maximum vertical clearance from the bottom of the mesh fence and the solid surface shall not be more than 4 inches (102 mm) from grade or decking.
4. An attachment device shall attach each barrier section at a height not lower than 45 inches (1143 mm) above grade. Common attachment devices include, but are not limited to, devices that provide the security equal to or greater than that of a hook-and-eye type latch incorporating a spring-actuated retaining lever such as a safety gate hook.
5. Where a hinged gate is used with a mesh fence, the gate shall comply with Section 305.3.
6. Patio deck sleeves such as vertical post receptacles that are placed inside the patio surface shall be of a nonconductive material.
7. Mesh fences shall not be installed on top of on-ground *residential* pools.

305.2.4.1 Setback for mesh fences. The inside of a mesh fence shall be not closer than 20 inches (508 mm) to the nearest edge of the water of a pool or spa.

305.2.5 Closely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the pool or spa side of the fence. Spacing between vertical members shall not exceed 1¾ inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1¾ inches (44 mm) in width.

305.2.6 Widely spaced horizontal members. Where the barrier is composed of horizontal and vertical members and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, the interior width of the cutouts shall not exceed 1¾ inches (44 mm).

305.2.7 Chain link dimensions. The maximum opening formed by a chain link fence shall be not more than 1¾ inches (44 mm). Where the fence is provided with slats fastened at the top and bottom which reduce the openings, such openings shall be not more than 1¾ inches (44 mm).

305.2.8 Diagonal members. Where the barrier is composed of diagonal members, the maximum opening formed by the diagonal members shall be not more than 1¾ inches (44 mm). The angle of diagonal members shall be not greater than 45 degrees (0.79 rad) from vertical.

Commented [MOU28]: This section was added along with the deletion of 305.2.10. See comment in that section for details. This is referring to a "baby gate" type of temporary "mesh fence", according to the ICC hearing testimony.

305.2.9 Clear zone. ~~Where equipment, including pool equipment such as pumps, filters and heaters, is on the same lot as a pool or spa and such equipment is located outside of the barrier protecting the pool or spa, such equipment shall be located not less than 36 inches (914 mm) from the outside of the barrier. There shall be a clear zone of not less than 36 inches (914 mm) between the exterior of the barrier and any permanent structures or equipment such as pumps, filters and heaters that can be used to climb the barrier.~~

~~**305.2.10 Poolside barrier setbacks.** The pool or spa side of the required barrier shall be not less than 20 inches (508 mm) from the water's edge.~~

305.3 Doors and gates ~~Gates, Access gates~~ **Doors and gates in barriers** shall comply with the requirements of Sections 305.3.1 through 305.3.3 and shall be equipped to accommodate a locking device. Pedestrian access ~~doors and~~ gates shall open outward away from the pool or spa, shall be self-closing and shall have a self-latching device.

305.3.1 Utility or service doors and gates. ~~Doors and~~ gates not intended for pedestrian use, such as utility or service ~~doors and~~ gates, shall remain locked when not in use.

305.3.2 Double or multiple doors and gates. Double ~~doors and~~ gates or multiple ~~doors and~~ gates shall have ~~not fewer than at least~~ one leaf secured in place and the adjacent leaf shall be secured with a self-latching device. ~~The gate and barrier shall not have openings larger than 1/2 inch (12.7 mm) within 18 inches (457 mm) of the latch release mechanism. The self-latching device shall comply with the requirements of Section 305.3.3.~~

~~**305.3.3 Latches.** Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from grade, the release mechanism shall be located on the pool or spa side of the gate not less than 3 inches (76 mm) below the top of the gate, and the gate and barrier shall not have openings greater than 1/2 inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.~~

305.3.3 Latch release. For doors and gates in barriers, the door and gate latch release mechanisms shall be in accordance with the following:

~~1. Where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such mechanism shall be located above the finished floor or ground surface in accordance with the following:~~

~~1.1. At public pools and spas, not less than 52 inches (1219 mm) and not greater than 54 inches (1372 mm).~~

~~1.2. At residential pools and spas, not less 54 inches (1372 mm).~~

~~2. Where door and gate latch release mechanisms are of the self-locking type such as where the lock is operated by means of a key, an electronic opener or the entry of a combination into an integral combination lock, the lock operation control and the latch release mechanism shall be located above the finished floor or ground surface in accordance with the following:~~

~~2.1. At public pools and spas, not less than 34 inches and not greater than 48 inches (1219 mm).~~

~~2.2. At residential pools and spas, at not greater than 54 inches (1372 mm).~~

~~3. At private pools, where the only latch release mechanism of a self-latching device for a gate is located on the pool and spa side of the barrier, the release mechanism shall be located at a point that is at least 3 inches (76 mm) below the top of the gate.~~

Commented [MOU29]: This section was added out of concern for the drowning hazard during construction. Also noted in the proposal is that pool contractors are not often responsible for the barrier, that may not be installed until much later in the project. This make it clear that responsibility must be taken to protect the pool, as related to the pool directly.

Commented [MOU30]: This was deleted as there is no reason a sound barrier could not be closer to the waters edge. However, "mesh barriers" are meant to address temporary "baby gates" and those are still required to be at least 20 inches away in the new section 305.2.4.1. These are not as robust, so if someone were able to get past one, they would not fall directly into the pool.

Commented [MOU31]: The purpose of this change was to align with IBC provisions latching hardware in IBC 1010.1.9.2

305.3.4 Barriers adjacent to latch release mechanisms. Where a latch release mechanism is located on the inside of a barrier, openings in the door, gate and barrier within 18 inches (457 mm) of the latch shall not be greater than 1/2 inch (12.7 mm) in any dimension.

305.4 Structure wall as a barrier. Where a wall of a dwelling or structure serves as part of the barrier and where doors, gates, or windows provide direct access to the pool or spa through that wall, one of the following shall be required:

1. Operable windows having a sill height of less than 48 inches (1219 mm) above the indoor finished floor, ~~and doors, and gates~~ shall have an alarm that produces an audible warning when the window, door or their screens are opened. The alarm shall be *listed* and *labeled* as a water hazard entrance alarm in accordance with UL 2017. ~~In dwellings or structures not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located 54 inches (1372 mm) or more above the finished floor. In dwellings or structures required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.~~
2. ~~In dwellings not required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located at not less than 54 inches (1372 mm) above the finished floor.~~
3. ~~In dwellings required to be Accessible units, Type A units or Type B units, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1219 mm) above the finished floor.~~
4. ~~In structures other than dwellings, the operable parts of the alarm deactivation switches shall be located not greater than 54 inches (1372 mm) and not less than 48 inches (1220 mm) above the finished floor.~~
5. ~~2.~~ A safety cover that is *listed* and *labeled* in accordance with ASTM F 1346 is installed for the pools and spas.
6. ~~3.~~ An *approved* means of protection, such as self-closing doors with self-latching devices, is provided. Such means of protection shall provide a degree of protection that is not less than the protection afforded by Item 1 or 2.

Commented [MOU32]: This language was retained, but moved out into independent items, 2, 3 and 4.

Commented [MOU33]: Item 4 was added, and "structures" was removed from item 3. This was to differentiate between accessibility for Type A and B dwelling units and all other accessible structures.

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305.5 On-ground residential pool structure as a barrier. An on-ground *residential* pool wall structure or a barrier mounted on top of an on-ground *residential* pool wall structure shall serve as a barrier where all of the following conditions are present:

1. Where only the pool wall serves as the barrier, the bottom of the wall is on grade, the top of the wall is not less than 48 inches (1219 mm) above grade for the entire perimeter of the pool, the wall complies with the requirements of Section 305.2 and the pool manufacturer allows the wall to serve as a barrier.
2. Where a barrier is mounted on top of the pool wall, the top of the barrier is not less than 48 inches (1219 mm) above grade for the entire perimeter of the pool, and the wall and the barrier on top of the wall comply with the requirements of Section 305.2.
3. Ladders or steps used as means of access to the pool are capable of being secured, locked or removed to prevent access except where the ladder or steps are surrounded by a barrier that meets the requirements of Section 305.

4. Openings created by the securing, locking or removal of ladders and steps do not allow the passage of a 4-inch (102 mm) diameter sphere.
5. Barriers that are mounted on top of on-ground *residential* pool walls are installed in accordance with the pool manufacturer's instructions.

305.6 Natural barriers. In the case where the pool or spa area abuts the edge of a lake or other natural body of water, public access is not permitted or allowed along the shoreline, and required barriers extend to and beyond the water's edge not less than 18 inches (457 mm), a barrier is not required between the natural body of water shoreline and the pool or spa.

305.7 Natural topography. Natural topography that prevents direct access to the pool or spa area shall include but not be limited to mountains and natural rock formations. A natural barrier *approved* by the governing body shall be acceptable provided that the degree of protection is not less than the protection afforded by the requirements of Sections 305.2 through 305.5.

