



**Boulder
County**

**Boulder County
Land Use Department
Publications**

Residential Plan Check List

Land Use Department
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**Building Safety &
Inspection Services:**
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Office Hours:
Mon., Wed., Thurs., Fri. 8 a.m.-4:30 p.m.
Tuesday 10 a.m.-4:30 p.m.

Building Permits can be applied for
and issued until 4 p.m.

Residential Plan Check List

Based on the Boulder County Building Code, and the 2015 International Residential Code (IRC) including Appendix F, G, H, and S.

Building Permit #:		
Snow Load:	Wind Load:	Exposure:

The items listed below are minimum code requirements with which your project must be in compliance. The circled items are important code requirements applicable to your plans. It is ultimately the responsibility of the builder to perform the construction according to the minimum code requirements, whether or not the items are circled on this list. Approval of the plans does not permit the violation of any part of the Boulder County Code. Contact the Building Safety & Inspection Services team at 720-564-2640 with questions.

Inspection Notes

This set of approved plans must be available to the building inspector on the site when inspections are made. Failure to have the county approved plans on the site at the time of inspection may result in no inspection performed or approved. **A paid re-inspection fee will be required prior to scheduling a follow-up inspection.**

Licensing Requirements

Since July 1, 2008, building contractors, HVAC contractors, and roofing contractors require licensing through Boulder County. Electricians and plumbers must be state-licensed.

Wildfire Requirements

1. Wildfire Zone 1 (mountains) requires the following ignition resistant construction: Class "A" roof coverings, deck floor covering, and gutter/downspout protection.

See the Boulder County Land Use Department Publication titled **Ignition-Resistant Construction** for more information. (Boulder County Building Code Amendment R327)

Wildfire Zone 1 (mountains) - Wildfire defensible space inspection is required to be completed prior to the foundation inspection and a wildfire mitigation inspection is required to be completed at final inspection. Call 303-441-3930 with inquiries or to schedule an inspection.

Sprinkler Requirements

2. A sprinkler system meeting the requirements of NFPA 13D or IRC P2904 must be installed throughout the dwelling. Provide proof of sprinkler plan review and rough sprinkler inspection report from the fire district or other certified inspector prior to the rough framing inspection. Provide the final inspection report prior to the final inspection. See the Boulder County Land Use Department Publication titled **Residential Fire-Protection System** for more information. (2015 IRC or BC Amendment R313)

Foundation, Basement, and Underfloor Area Requirements

3. Burial depth requirements:

See the Boulder County Land Use Department Publication titled *Burial Depth*, for more information.

Electrical - direct burial conductors shall be a minimum of 24-inches deep, non-metallic conduit 18-inches deep or 24-inches under driveways. (IRC Table E3803.1)

Water Lines - shall be a minimum of 36-inches deep. (IRC P2603.6)

Gas Service Piping - installed a minimum of 12-inches below grade or 8-inches below grade where serving individual outside appliances. An 18 AWG yellow insulated tracer wire must be installed adjacent to underground nonmetallic gas piping and terminate above grade at each end. (IRC G2415.1.2 and G2415.17.3)

4. Underground plumbing pipe shall have a solid and continuous load-bearing support. Piping cannot bear on rocks. Pipes passing under a footing or through foundation wall shall be provided with a relieving arch or a sleeve. Trenches parallel to footing shall not extend below the 45° plane of the edge of the footing.

Water piping must be buried a minimum 36-inches deep. Water service pipe may be installed in the same trench as the building sewer provided the sewer pipe material is listed for underground use within the building or the water service pipe is separated from the sewer by a minimum distance of 5-feet horizontally or elevated at least 12-inches above and to one side of the sewer line. See the Boulder County Land Use Department Publication titled *Burial Depth* for more information. (IRC P2603.5, 2604.2, P2604.4, P2605.1)

5. Frost depth to the bottom of the foundation footings must be as noted on the engineered plans. If not noted, the frost depth to the bottom of the footings must be a minimum of 30-inches below finished grade. (IRC Table R301.2.1)
6. Caisson and helical pier foundations will not be inspected by Boulder County. A qualified, Colorado-licensed engineer must perform the placement, drilling, and reinforcement of drilled piers. A signed, sealed and dated inspection report must be provided to Building Safety & Inspection Services prior to the rough inspections. (BC Amendment R110.3)
7. A perimeter drain system that discharges to an approved drainage system is required around all foundations that enclose usable spaces below grade. Foundations that retain earth and enclose interior spaces below grade must be damp proofed. (IRC R405.1, R406.1, BC Amendment R401.2.14)
8. (Not used)
9. Garage and carport floor surfaces must be approved noncombustible materials. Floors must be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway. (IRC R309.2)
10. Foundation plates and sills must be bolted to the foundation wall as prescribed on the engineered plans. If not noted, bolts shall have a minimum diameter of ½-inch, embedded at least 7-inches and spaced not more than 6-feet apart. A minimum of 2 bolts are required per plate section, with one bolt located within 12-inches of each end of each plate. (IRC R403.1.6)

Manufactured or Factory-Built Buildings

11. Manufactured Home & Factory Built Housing Requirements

Installation Manual: Installation of a manufactured home shall be in accordance with the manufacturer's installation instructions. Where the installation instructions are unavailable, installation shall be in accordance with the following standards:

- A. Non-Permanent Installations: NCSBCS/ANSI A225.1-1994.
- B. Permanent Foundation Installations: Permanent Foundation, Guide for Manufactured Housing, September 1996 (amended).
- C. Engineered Foundation System as required by Boulder County Building Department.
- D. IRC Appendix E

A copy of the manufacturer's instructions or the standards shall be available on site at the time of installation and inspection.

HUD Manufactured Units

Label: Each section of each home shall be labeled by the inspection agency. The permanently affixed label is located on the rear of each unit.

Data Plate: Each HUD home shall bear a data plate located near the main electrical panel, master bedroom closet, laundry room, or other readily accessible and visible location.

Factory-Built Units

Colorado State Label: The State of Colorado, Division of Housing insignia will be found in the kitchen sink cabinet.

Installation Insignia: An insignia placed within 30" of the electric meter housing, or service entry, or on the meter housing.

See the Boulder County Land Use Department Publication titled *Manufactured Home & Factory Built Housing* for more information (Manufactured Home and Factory Built Housing Installation Handbook, Colorado Division of Housing).

Rough Framing and Wood Requirements

- 12. The complete rough inspection is to be made after the rough framing, rough electric, rough plumbing, and rough heat and ventilation are complete. The building should be fully enclosed with the roof covering and siding in place. (BC Amendment Section 110)
- 13. Lumber, plywood, fiberboard, structural logs, and glued laminated timber must be identified by a grade mark or certificate of inspection issued by an approved agency. (IRC R502.1, R602.1, and R802.1)
- 14. Wood in contact with the ground that supports structures for human occupancy must be approved pressure-preservative-treated wood. (IRC R317.1.2)
- 15. Protection from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative treated in accordance with AWPA U1: (IRC R317)
 - A. Wood joists closer than 18-inches and wood girders closer than 12-inches to grade located within foundation periphery.
 - B. Wood framing members that rest on concrete or masonry foundation walls and are less than 8-inches from the exposed ground.
 - C. Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground.
 - D. Wood girders entering concrete or masonry walls with a clearance less than ½-inch.
 - E. Wood siding, sheathing, and wall framing less than 6-inches above the ground.
 - F. Wood members supporting moisture-permeable floors or roofs that are exposed to the weather.
 - G. Wood furring strips or wood members attached directly to the interior of below grade exterior masonry or concrete walls.
 - H. Wood in contact with the ground, embedded in concrete in direct contact with the ground or embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy shall be approved pressure-preservative-treated wood.

16. Accessible under-floor areas shall be provided with a minimum 18-inches x 24-inches opening through the floor or 16-inches x 24-inches opening through the perimeter wall. When the access is through a below-grade wall an areaway of not less than 16-inches x 24-inches must be provided. Where equipment is located beneath the floor, the access opening must be within 20-feet of the equipment and allow the removal of the largest piece of equipment. (IRC R408.4 and M1305.1.4)
17. Basements greater than 200 square feet and every sleeping room shall have at least one operable emergency and rescue opening or a door to the exterior. Emergency escape and rescue openings shall meet the following requirements: A minimum clear width of 20-inches, a minimum clear height of 24-inches, with a total net clear opening of 5 square feet for grade level windows and 5.7 square feet for all others. A sill height of not more than 44 inches measured from the finished floor to the bottom of the clear opening. Window wells for emergency escape and rescue shall provide a minimum net area of 9 square feet with minimum horizontal projection and width of 36-inches. The area of the widow well shall allow the emergency escape and rescue opening to fully open. See the Boulder County Land Use Department Publication titled *Emergency Escape and Rescue Openings*, for more information. (IRC R310)
18. Columns must be restrained to prevent lateral displacement at the bottom end to insure against uplift. (IRC R301.2.1, R407.3)
19. Fire blocking shall be installed to cut off all concealed draft openings in the following locations: (IRC 302.11)
 - A. In concealed spaces of stud walls and partitions, including furred spaces, vertically at the ceiling and floor levels, and at 10-foot horizontal intervals.
 - B. At interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings, and cove ceilings.
 - C. In openings around vents, pipes, ducts, cable, wires, chimneys, fireplaces, and similar openings that afford a passage for fire at ceiling and floor levels.
 - D. In concealed spaces between stair stringers at the top and bottom of the run, and between studs in line with the run of the stairs at unfinished walls.
20. Stairways must be at least 36-inches in width. Handrails shall not project more than 4½-inches. The maximum rise may not exceed 7¾-inches. The minimum tread depth may not be less than 10-inches. Minimum headroom is 6-feet, 8-inches. For stairways with solid risers a nosing of ¾-inch to 1¼-inches shall be provided. When open risers are used the opening between the treads shall not allow the passage of a 4-inch sphere. Landings must be provided at the top and bottom of the stairway that is the width of the stairway measuring at least 36-inches in the direction of travel. See the Boulder County Land Use Department Publication titled *Residential Stairways, Handrails, Ramps, and Guards* for more information. (IBC 110.3 R610)
21. Winding stairways require a 10-inch tread depth at a point 12-inches from where the tread is the narrowest. Winder treads shall have a minimum tread depth of 6-inches. See the Boulder County Land Use Department Publication titled *Residential Stairways, Handrails, Ramps, and Guards*, for more information. (IRC R311.7.5.2.1)
22. Structural insulated panels (SIPs) must be installed per the listing. Provide a panel layout schedule at the rough inspection. A Colorado-licensed engineer must inspect panels supporting other than uniform loads and the written report provided to the Building Inspection Services. (BC Amendment R110.7.1)
23. Insulated concrete form (ICF) wall systems must be designed by a Colorado-licensed engineer or be designed per IRC R611 to include reinforcement, lintels, sill and ledger anchorage. Foam insulation may not be exposed to the interior of the building. (IRC R608)
24. One layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all walls within the exterior wall envelope. (IRC R703.2)
25. Ceiling heights for habitable rooms, hallways, bathrooms, toilet rooms, laundry rooms, and basements shall be a minimum of 7-feet measured from the finished floor to the lowest projection of the ceiling. Non-habitable basements may have a ceiling height of 6-feet, 8-inches with clearance below beams and ducts of 6-feet, 4-inches. Bathroom may have a ceiling height of 6-feet, 8-inches at the fixture front clearance area and over the fixture. (IRC R305.1)
26. Attic access must be provided for attics that exceed 30 square feet and that have a vertical height of 30-inches or greater. The access must be located in a hall or readily accessible location with a minimum 22-inches x 30-inches access opening. The access must provide a minimum of 30-inches headroom. (IRC R807)
27. **Roof ventilation (IRC R806)**
 - A. Enclosed attic and rafter spaces must have cross ventilation for each space through screened openings. The total net free ventilating area shall not be less than 1 to 150 of the area of the space ventilated. The area may be reduced

to 1 to 300 if 50-80% is provided by ventilators located in the upper portion of the space or if a vapor barrier not exceeding 1 perm is installed on the warm side of the ceiling. At least a 1-inch space is required between the roof sheathing and the insulation at the location of the vent. (IRC R806.1)

B. Unvented attic and unvented enclosed rafter assemblies. Unvented attics and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members/rafters, shall be permitted where all the conditions of R316 and R806.5 are met.

28. Rafters must be framed to a minimum 1-inch nominal ridge board that is not less than the depth of the cut end of the rafter or to each other using a gusset plate. Hip, and valley rafters shall be a minimum of 2-inches and not less in depth than the cut end of the rafter. Hip and valley rafter shall be supported at the ridge by a brace to a bearing partition or be designed. (IRC R802.3)

29. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 5:1 shall be provided with lateral support at points of bearing to prevent rotation. Rafters and ceiling joists having a depth-to-thickness ration exceeding 6:1 shall be supported laterally by solid blocking, diagonal bridging or a continuous 1-inch by 3-inch wood strip nailed across the rafters. (IRC R802.8)

Roof trusses or rafters must be attached to supporting walls with approved hurricane clips. Trusses must be braced to prevent rotation and to provide lateral stability in accordance with the construction documents and the individual truss design drawings. (IRC R502.11.2, R802.11)

30. Trusses must be designed and fabricated in accordance with ANSI/TPI 1. A licensed professional shall prepare the truss design. Trusses must be legibly marked within 2-feet of the center to identify the manufacturer, the design load, and the spacing. Truss engineering and layout must be provided at the site at the rough framing inspection. (IRC R502.11 and R802.10)

31. Roofing material installed in the mountain areas is limited to Class "A" roof coverings. Wood roofs in the plain areas are limited to minimum Class "B" roof coverings. Shingle installation shall meet the manufacturer's high-wind installation procedures in areas where wind load is greater than 110 mph (V3S). See the **Boulder County Wind Speed** map for wind speed information. (IRC Chapter 9, BC Amendment R301.2.1, R327, and manufacturer's listing)

32. Roofs decks and enclosed roofed areas must be provided with roof drains installed at the low point of each roof. Where roof drains are installed, overflow drains or scuppers are required. (IRC R903.4)

33. Exterior finish materials must conform to the conditions of your Site Plan Review to include: roof covering, siding, ignition resistant construction, color requirements, conforming light fixtures which comply with the approved lighting plan, and re-vegetation requirements.

Glazing And Window Requirements

34. All habitable rooms shall be provided with aggregate glazing area for natural light of not less than 8% of the floor area of such rooms. The glazed areas need not be installed in rooms where section M1507 is satisfied and artificial light is provided at an average of 6 footcandles at a height of 30 inches. Sleeping rooms must meet egress requirements. (IRC R303.1, R310)

35. Safety glazing shall be installed in the following hazardous locations and be permanently labeled as safety or tempered glazing: glazing panels in doors; glazing enclosing spas, bathtubs or showers; glazing panels adjacent and within 24-inches of the edge of a door; glazing panels greater than 9 square feet within 18-inches of the floor; glazing used for railings; glazing used for barriers for swimming pools and spas; and glazing enclosing stairways, landings, and ramps within 36-inches horizontally of a walking surface. See the Boulder County Land Use Department Publication titled Safety Glazing, for more information. (IRC R308)

36. Skylights must be: (IRC R308.6 and BC Amendments Table N1102.1)

A. laminated glass (with restrictions).

B. fully tempered glass (with retaining screen).

C. heat-strengthened glass (with retaining screen).

D. wired glass (with retaining screen in multiple glazing condition only).

E. approved rigid plastic.

F. Skylight U-factor required U-0.45.

Skylights installed on roofs flatter than 3 units vertical to 12 units horizontal must be mounted on a curb 4-inches above the roof.

Heating and Ventilation Requirements

37. Crawl spaces shall be provided with conditioned air in compliance with IRC 408.3 Crawl space walls shall be insulated in accordance with Table N1102.1.2 or Table N 1102.1.4. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finish grade level and then vertically and/or horizontally for a least an additional 24-inches. Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder with a minimum thickness of 10-mil. All joints of the vapor retarder shall overlap by 6-inches and be sealed and taped. The edges of the vapor retarder shall extend at least 6-inches up the stem wall and shall be attached to the stem wall. N1102.2.11
- Ventilated crawlspaces. Ventilated crawlspaces shall be provided with insulation in accordance with Table N1102.1.2, R408.1, R408.2
38. Ventilation (IRC R303.1, BC Amendments N1103.6 and Table N1103.6.1)
- A.** Habitable rooms must be provided with outdoor openings for ventilation equal to at least 4% of the floor area and shall have heating facilities capable of maintaining 68° at 3-feet above the floor and 2-feet from exterior walls.
- B.** The windows need not be openable in a room where an opening is not required to be an egress window, and a whole house mechanical ventilation system designed to meet M1507.3 is installed.
39. Bathroom exhaust fans shall exhaust directly to the exterior and must be provided in bathrooms where windows of at least 3 square feet are not provided. The mechanical ventilation must be capable of providing an exhaust capacity of 50 cfm intermittent or 20 cfm continuous exhaust. (IRC R303.3, M1507.4)
40. Dryer vents must be rigid metallic, independent of all other systems, shall terminate outside the building, be equipped with a back draft damper, and sized and terminated per the manufacturer. The maximum length of the exhaust duct shall be 35-feet (Unless approved under the manufacturer's listing) from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with (IRC Table M1502.4.4.1) Flexible transition ducts are limited to 8-feet, shall not be concealed within construction, and shall be listed and listed per UL 2158A. (IRC M1502)
41. Appliances and equipment shall be installed in accordance with the conditions of their listing. Manufacturer's installation instructions must be available at the time of the inspection. (IRC G2408.1, M1307.1, M1401.1, M1902.2)
42. Appliances shall be accessible for inspection, service, repair and replacement without removing permanent construction. 30-inches of working depth and width shall be provided in front of the control side of an appliance. (IRC M1305.1)
43. Gas and solid fuel appliances located in a garage and hazardous locations shall be elevated so the source of ignition is at least 18-inches above the floor. Rooms and spaces that are communicate directly with the garage and are not part of the living space shall be considered as part of the garage. Appliances located in garages must be installed at least 6-feet above the floor or protected from motor vehicle impact. (IRC G2408.2, G2408.3)
44. Combustion air is required for all liquid fuel, solid fuel and gas appliances. (IRC M1701.1, G2407)
45. Gas burning appliances may not be located in or obtain combustion air from: a sleeping room, bathroom, toilet room, or storage closet unless it is a direct vent appliance or installed in an enclosure that opens only into a bedroom or bathroom in and such enclosure is provided with a solid weather-stripped door, a self-closing device and all combustion air is taken from the outdoors. (IRC G2406.2)
46. Gas logs installed in solid fuel burning fireplaces shall be tested in accordance with ANSI Z21.60 and installed per the manufacturers installation instructions. Gas logs installed in bedrooms must be direct vent or provided with an approved source of outside combustion air. The approved gas log set must be installed in the Solid-fuel burning appliances at the final inspection. (IRC G2406, G2432, and G2434)
47. Solid-fuel-burning fireplace stoves, fireplace inserts or wood stove appliances shall conform with emissions testing, certification and labeling requirements per Title 30, Article 28, Sections 402-405 of the Colorado Revised Statutes. The Air Pollution Control Division of the Colorado Department of Health must certify these appliances to meet the emissions standards of Section IV of Regulation No. 4 of Volume I of the Colorado Air Quality Control Commission as EPA Phase II or Colorado Phase III solid-fuel-burning devices. (BC Amendment IMC Chapter 9)
48. B, BW, and L vents and factory-built chimneys must be provided with a clearance to combustibles per the manufacturer's listing. Where vents pass through insulated assemblies, they must be provided with an insulation shield. A clearance of 9-inches is required between single wall vent connectors and combustibles. Gas vents must penetrate through the roof flashing, jack or thimble and terminate in a listed cap or per the manufacturers listing. Decorative shrouds installed at terminations shall be listed and installed per the manufacturer. (IRC G2425, G2426, G2427)

49. Chimneys shall be protected with a spark arrester consisting of 19 gage galvanized steel or 24 gage stainless steel, with openings not exceeding ½-inch. (IRC R1003.9.2)

Electrical Requirements

50. All electrodes present at each structure shall be bonded together to form one grounding electrode system to include: Concrete Encased Electrodes (UFER), water piping, ground rings, grounding rods, and plate electrodes. Bonding shall ensure electrical continuity. The electrode conductor must be connected in an approved manner and inspected prior to concealing. (IRC E3607, E3608, E3609, E3610, E3611)(NEC 250.24, 250.28, 250.32, 250.50)
51. All electrical receptacle, switch, light, and junction boxes shall be made up using proper mechanical connectors at time of rough inspections. This includes hot, neutral, and grounding conductors.
52. Tamper -resistant Receptacle outlets are required in every kitchen, family room, dining room, living room, parlor, library, den, sunroom, bedroom, recreation room or similar dwelling areas spaced so that no point along the wall line exceeds 6-feet from an outlet. (IRC 3901, E4002, E400.14)(NEC 210.52, 406.3, 406.12)
- A.** Counters 12-inches in width or wider shall have receptacles placed no more than 20-inches above the counter top and spaced so no point exceeds 24-inches from an outlet.
- B.** Island and peninsula counters with a length at least 24-inches and a width of 12-inches or greater must be equipped with at least one outlet.
- C.** At least one receptacle shall be installed in a bathroom within 36-inches of each basin.
- D.** At least one receptacle shall be installed for laundry equipment, in unfinished basements, and in each car space of attached and detached garages. The branch circuit supplying the garage receptacles shall not supply outlets outside of the garage. (IRC 3901.9)(NEC 210.52(G)(1))
- E.** Not less than one receptacles outlet that is readily accessible from grade level and located not more than 6 feet 6 inches above grade, shall be installed outdoors at the front and back of each dwelling unit having direct access to grade level. Balconies, decks, and porches that are accessible from inside of the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck, or porch.
- F.** At least one receptacle outlet that is accessible while standing at grade level and located not more than 6-feet,6-inches (1981-mm) above grade, shall be installed outdoors at the front and back of each dwelling unit having direct access to grade. Balconies, decks, and porches that is accessible from inside of the dwelling unit.
- G.** Attics or crawlspaces containing equipment must be provided with at least one receptacle outlet within 25-feet of the equipment.
- H.** Hallways of 10 feet or more in length shall have at least one receptacle outlet. The hall length shall be considered the length measured along the centerline of the hall without passing through a doorway. Foyers that are not part of a hallway and is greater than 60 square feet shall have a receptacle(s) located in each wall space that is 3 feet or more in width. Doorways, door-side windows that extend to the floor, and similar openings shall not be considered as wall space.
53. A minimum of two 20-amp rated branch circuits shall serve receptacles in the kitchen, pantry, breakfast area, and dining area. At least one 20-amp branch circuit shall supply bathroom receptacles and at least one 20-amp branch circuit shall supply laundry. Refrigerator receptacle can be connected to one of the two required kitchen branch circuits or from an individual branch circuit rated 15 amperes or greater. (IRC E3703.2, E3703.3, E3901)(NEC 210.52(B))
54. Ground fault protection shall be provided on all 125-volt single phase 15 and 20-ampere receptacles installed in bathrooms, garages and accessory buildings, outdoors, crawl spaces, unfinished areas of basements, kitchens including dishwashers, within 6' of all other sinks, and laundry areas. Ground-fault circuit interrupters shall be installed in readily accessible locations. (IRC E3902)(NEC 210.8, 210.8(D))
55. **A.** Combination type arc-fault circuit interrupters must be installed on all 120-volt 15 and 20-amp branch circuit outlets installed in kitchens including dishwashers and disposal, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways, laundry areas and similar rooms or areas. Arc-fault circuit interrupters shall be installed in readily accessible locations. (IRC E3902.16)(NEC 210.12)
- B.** Whenever a branch circuit wiring is modified, replaced, or extended in any of the areas specified in 55A above, the branch circuit shall be protected by one of the following: (IRC 3902.17)(NEC 210.12(B))
1. A combination-type AFCI located at the origin of the branch circuit
 2. An outlet branch circuit type AFCI located at the first receptacle outlet of the existing branch circuit.

Exception: AFCI protection shall not be required where the extension of the existing conductors is not more than 6' in length and does not include any additional outlets or devices.

56. At least one wall switch-controlled lighting outlet shall be installed in every habitable room, bathroom, hallway, stairways, attached garage, detached garage and assessor building with electric power, and at the exterior side of each outdoor exit door having grade level access. Attics, under floor spaces, utility rooms and basements containing equipment or used for storage must be provided with a switch operated light. (IRC E3903)(NEC 210.70)
57. Smoke alarms shall comply with UL 217 and UL 2034. Smoke alarms are to be powered by the building's wiring with battery backup and shall be interconnected so the actuation of one alarm will activate all alarms in the dwelling unit. Interconnection of smoke alarms shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes. Smoke alarms shall be permitted to be battery operated where installed in buildings without commercial power. Smoke alarms shall be installed in the following locations: (IRC R314)
- A. In each sleeping room;
 - B. Outside each sleeping area in the immediate vicinity of the bedrooms
 - C. One on each additional story including basements.
 - D. Smoke alarms shall be installed not less than 3 feet horizontally from the door or opening of the bathroom that contains a bathtub or shower unless this is would prevent placement of a smoke alarm in locations listed above.
- Carbon Monoxide alarms shall comply with UL 2034 and UL 217. Carbon Monoxide alarms are required in a single-family dwelling that has fuel-fired appliance(s), or an attached garage. The alarm must be installed within 15-feet of the entrance to each sleeping room and must be listed by a nationally recognized, independent lab. Plugs into a dwelling's electrical outlet and has a battery backup. They may be combined with a smoke-detecting device if the combined device complies with applicable law. (IRC R315)
58. Clothes closet lighting shall be limited surface-mounted or recessed incandescent fixtures with completely enclosed lamps, surface-mounted or recessed fluorescent fixtures, surface-mounted fluorescent or LED luminaires identified as suitable for installation within the closet storage space.
- Surface mounted and recessed fixtures shall be installed on the wall above the door or on the ceiling with the following clearances between the fixture and the nearest point of a storage space as follows: (IRC E4003.12, NEC 410.16)
- A. Incandescent fixtures or LED shall have a minimum 12-inch clearance.
 - B. Fluorescent fixtures shall have minimum 6-inch clearance.
 - C. Recessed incandescent or LED luminaires with completely enclosed light source shall have a minimum of 6" clearance.
 - D. Recessed fluorescent fixtures shall have a minimum 6-inch clearance.
59. Working space must be provided around energized equipment for servicing and maintenance. The minimum dimensions shall not be less than 36-inches in depth and 30-inches in width in front of the equipment. Working space shall extend to at least 6-feet, 6-inches above the floor. (IRC E3405.2, NEC 110.26)
60. Electrical fixtures installed in wet or damp locations shall be installed so that water cannot enter or accumulate in wiring compartments or other electrical parts. Fixtures installed in wet locations must be labeled "suitable for wet locations." Fixtures installed in damp locations must be labeled "suitable for damp locations" or "suitable for wet locations." Switches or circuit breakers located in wet locations or outdoors must be enclosed in a weatherproof enclosure. Outdoor receptacles must have a weatherproof enclosure and an in-use cover. (IRC 4003.9, 4001.7, 4002.8, NEC 410.10(A), 404.4, 406.9(A))
- Cord-connected fixtures, hanging fixtures, track lighting, pendants, and ceiling fans shall not be located within 3-feet horizontally and 8-feet vertically from the top of a tub or shower rim. (IRC E4003.11, NEC 410.10(D))
61. Swimming pools, fountains, hot tubs, spas, and hydro-massage "Jacuzzi" tubs and similar installations shall comply with all provisions of the IRC for the approval of bonding equipment and lighting. All 15 and 20 amp, single-phase 125-volt receptacles located within 20-feet of the inside walls of pools, outdoor spas and hot tubs shall be protected by a GFCI circuit. Motors and equipment must be accessible without damaging the building structure or building finish. (IRC E4202, E4203, E4204, E4205, E4206)(NEC 680)
62. The reinforcing shell of the pool shell, metal forming shells, coping stones, deck, brackets of niche fixtures, metal fittings, and electrical equipment, located less than 5-feet horizontally and less than 12-feet above maximum water level of swimming pools and built in place hot tubs shall be bonded together. The parts specified above shall be connected to an equipotential bonding grid. (IRC E4204.2, NEC 680.26)

Plumbing Requirements

63. Piping must be inspected and tested prior to concealing. It shall be protected against physical damage and it must be approved for use and bear the identification of the manufacturer. (IRC P2503, P2603, P2609)
64. Where drainage is roughed-in for future fixtures, the installation shall be terminated with an accessible permanent plug or cap fitting. (IRC P3005.1.6)
65. The centerline of toilets or bidets shall not be less than 15-inches from adjacent walls or tub. Toilets, bidets, and lavatories must have a minimum clear space of 21-inches in front of the fixture. (IRC P2705)
66. Showers and tub/shower combinations shall have control valves of the pressure balance, thermostatic mixing or combination pressure balance/thermostatic mixing valve types with high limit stop per ASSE 1016 or CSA B125.1.6. Tubs shall also have a control valve as listed for a shower or a water-temperature-limiting device that conforms to ASSE 1070. The high limit stop for a device shall be set to a maximum of 120°. (IRC P2708.3, P2713.3)
67. Backflow prevention must be provided to prevent contamination of potable water. This includes but is not limited to: hose connections, irrigation systems, boilers, solar systems, fire sprinklers, and dishwashers. (IRC P2902.2, Table P2902.3, P2717)

Insulation

68. Insulation and energy conservation shall meet Boulder County BuildSmart program (Boulder County's green building program). See the Boulder County Building Code Amendments or Boulder County BuildSmart Section N1102.1 Prescriptive Path Option Requirements for more information. Conform to the HERS rating or prescriptive path.
69. Foam plastic must have a flame spread rating of not more than 75 and a smoke development index of not more than 450. Foam insulation must be separated from the interior of the building by a ½-inch gypsum board or an approved thermal barrier. In an attic or crawlspace, foam may be protected by: 1½-inch mineral fiber insulation; ¼-inch wood structural panel; 3/8-inch particle board; ¼-inch hardboard, 3/8-inch gypsum board, or corrosion-resistant sheet metal not less than .016 thick. (IRC R316)
70. Combustible insulation shall be separated a minimum of 3-inches from fan motors and heat-producing devices. Insulation shields must be provided where vents pass through insulated assemblies and must terminate at least 2-inches above attic insulation materials. Can lights must be airtight if located in the building envelope. (G2426.4 and BC Amendments N1102.4.5) Recessed lighting fixtures must either be IC-rated or installed in a sealed box in which the insulation is at least 3-inches from the light fixture. All recessed lights must be tightly sealed or gasketed to prevent air leakage through the fixture into the ceiling cavity. (IRC N1102.4.5)
71. Class I or II vapor retarders are required on the interior side of the insulation in framed walls, floors and roof/ceilings of the building's thermal envelope. The vapor barrier is not required in construction where moisture or freezing will not damage the materials, or where the framed cavity (or space) is ventilated to allow moisture to escape. A vapor retarder is not recommended on a concrete basement foundation wall or in a shower/bath compartment (IRC 702.7, R702.7.1). Comply with the manufacturers specification listing for the product installation.

Wallboard Requirements

72. The garage shall be separated from the residence and its attic by materials of not less than ½-inch gypsum board applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than 5/8-inch Type X gypsum board. Where the separation is a floor-ceiling assembly, the structure supporting the separation shall also be protected by not less than ½-inch gypsum board. (IRC R302.6)
Openings between the garage and residence shall be equipped with solid wood doors not less than 1 3/8-inch in thickness, solid or honeycomb core steel doors not less than 1 3/8-inch thick, or 20-minute fire-rated doors. Openings are prohibited between garages and rooms used for sleeping. (R302.5.1 and BC Amendments N1105.2.4) Doors between attached garages and living space shall be weather stripped to the degree necessary to make them airtight and shall be self-closing and self-latching.
73. Enclosed accessible space under stairs shall have walls, under stair surface and any soffits protected on the enclosed side with ½-inch gypsum board (IRC R302.7).
74. Water-resistant gypsum backing board used as the base or backer for adhesive application of ceramic tile or other required nonabsorbent finish material shall conform to ASTM C1396, C1178 or C1278. It is permitted on ceilings where framing spacing does not exceed 12-inches o.c. for ½-inch thick or 16-inches o.c. for 5/8-inch thick gypsum board. Water-resistant gypsum board shall not be installed over a vapor retarder in a shower or tub compartment and may not be used where there will be direct exposure to water, or in areas of continuous high humidity. All cut and exposed edges shall be sealed. (IRC R702.3.7)

75. Cement, fiber-cement, glass mat gypsum backer and fiber reinforced gypsum in compliance with ASTM C 1288, C 1325, C1178, or C1178 and installed in accordance with manufacturer recommendations shall be used as backers for wall tile in tub and shower areas and wall panels in shower areas. (IRC R702.4.2)
76. Gypsum Board Applied to Ceilings: (IRC Table R702.3.5)
- A. 3/8-inch Thick Material: Framing 16-inches o.c. with gypsum applied perpendicular to the framing. Fasteners shall be 13ga nails or 4d cooler nails spaced a maximum of 7-inches or type S or W screws spaced a maximum of 12-inches.
- B. 1/2-inch Thick Material: Framing 16-inches o.c. with the gypsum applied either direction or framing 24-inches o.c. the gypsum must be applied perpendicular to the framing. Fasteners shall be 13ga nails, 5d cooler nails or gypsum board nails spaced a maximum of 7-inches or type S or W screws spaced a maximum of 12-inches. Textured ceilings shall be sag-resistant gypsum applied perpendicular to framing at 16-inches o.c. and 24-inches o.c. Gypsum board thickness shall be a minimum of 1/2-inch for 16-inches o.c. and 5/8-inch for 24-inches o.c. Fasteners shall be 13ga nails, 5d or 6d cooler nails or gypsum board nails spaced a maximum of 7-inches or type S or W screws spaced a maximum of 12-inches.
- C. 5/8-inch Thick Material: Framing 16-inches o.c. with the gypsum applied in either direction or framing 24-inches o.c. gypsum must be applied perpendicular to the framing. Fasteners shall be 13ga nails, 6d cooler nails or gypsum board nails shall be spaced a maximum of 7-inches or type S or W screws spaced a maximum of 12-inches.
- Type X gypsum board for garage ceilings beneath habitable rooms shall be perpendicular to the ceiling framing by 1-inch 6d coated nails or equivalent drywall screws spaced at 6-inches o.c.

Final Inspection Requirements

77. Buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. (IRC 319)
78. At least one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged, and shall provide a minimum clear width of 32-inches (813-mm) when measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The minimum clear height of the door opening shall not be less than 78-inches (1981-mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort. (IRC R311, R311.2)
79. There shall be a floor or landing on each side of each exterior door, except where a stairway with 2 or fewer risers located on the exterior side of the door, other than the required exit door, a landing is not required for the exterior side of the door. The landing must be no lower than 7³/₄-inches below the top of the threshold of the door provided the door does not swing over the landing. (IRC R311)
80. Handrails shall be provided on at least one side of stairways with 4 or more risers and ramps with a slope exceeding 1:12. Handrails shall be mounted 34-inches to 38-inches above the nosing of the treads. Handrails must be continuous for the entire length of the stairs and provided with a minimum space of 1¹/₂-inch between the wall and the handrail. Ends shall be returned or terminate in newel posts or safety terminals. See the Boulder County Land Use Department Publication titled *Residential Stairways, Handrails, Ramps, and Guards* for requirements and more information. (IRC R311.7.8)
- Handrail Grip Size Shall Be:**
- A. Circular Handrails: 1¹/₄-inch to 2-inches perimeter.
- B. Non-Circular: 4-inches to 6¹/₄-inches perimeter with a maximum cross section of 2¹/₄-inches.
- C. Perimeter Dimension Greater than 6¹/₄-inches: shall have a finger recess on both sides.
81. Guards must be provided for porches, screened porches, balconies, fixed seating and raised floor surfaces more than 30-inches above the floor or grade below. Guards must have a minimum height of 36-inches. Open sides of stairs with a total rise of more than 30-inches above the floor or grade below shall have guards not less than 34-inches high. Intermediate rails shall not allow the passage of a 4-inch sphere. (R312)
- Window fall protection must be provided for window openings less than 24 inches above the finished floor and more than 72 inches above grade or surface below. (R312.2) See the Boulder County Land Use Department Publication titled *Residential Stairways, Handrails, Ramps, and Guards*, for more information. (IRC R312)
82. Bathtubs, walls above bathtubs with shower heads, shower floors, and shower compartments shall be finished with a non-absorbent surface which extends to a height not less than 6' above the floor. Showers must have a minimum 900 square inches of interior area and a minimum dimension in each direction of 30-inches. Shower valves must be pressure balance/thermostatic mixing valves. Shower receptors shall have a curb threshold not less than 1-inch below

the sides and back of the receptor. The curb shall measure a minimum of 2-inches to a maximum of 9-inches above the top of the drain. (IRC R307, P2708, P2709)

83. Smoke alarms shall be provided for new dwellings or for existing dwellings when interior alterations, repairs, or additions requiring a permit occur. New alarms in existing areas are not required to be interconnected and hard wired where the alterations do not require the removal of interior wall or ceiling finishes and no attic, crawlspace, or basement access is available to provide access for hard wiring and interconnection. (IRC R314)
- Carbon Monoxide alarms are required in a single-family dwelling that has fuel-fired appliance(s), or a fireplace, or an attached garage. The alarm must be installed within 15-feet of the entrance to each sleeping room. Must be listed by a nationally recognized, independent lab. Plugs into a dwelling's electrical outlet and has a battery backup. They may be combined with a smoke-detecting device if the combined device complies with applicable law. (IRC R315)
84. EIFS exterior finish system installers must be certified and provide a copy of the ICBO required installation report to the Building Inspection Services prior to the final inspection (Evaluation Report).
85. All dwellings shall have a controlled method of water dispersal from roofs that will collect and discharge all roof drainage at least 5-feet from the foundation. Gutters, downspouts, downspout extensions shall be deemed adequate to meet these requirements. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection so as to not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of 6-inches within the first 10-feet. (IRC R401.3 and R801.3)
86. Site Plan Review requirements must be inspected and approved prior to final inspection approval of the building permit.
87. Provide a passive radon control system intended to resist entry and prepare the building for post-construction radon mitigation if necessary. (IRC Appendix F)
88. Provide a Solar pre-wire option for every new single-family detached residence shall include one of the following:
- A. A residential photovoltaic solar generation system or a residential solar thermal system, or both; or
 - B. Upgrades of wiring or plumbing, or both, installed by the builder to accommodate the future installation of a residential photovoltaic solar generation system or a residential solar thermal system, or both; or
 - C. A metallic chase or conduit, or both, constructed to allow ease of future installation of the necessary wiring or plumbing for a residential photovoltaic solar generation system or a residential solar thermal system, or both. (BC Amendments R328)
89. Provide a electric vehicle charging pre-wire option for every new garage or carport shall include one of the following, installed in accordance with the requirements of Article 625 of the Electrical Code (BC Amendments R329):
- A. Level 2 (240-volt 40A minimum circuit) electric vehicle charging receptacle outlet, or
 - B. Upgraded wiring to accommodate the future installation of a Level 2 (240-volt) electric vehicle charging receptacle outlet, or
 - C. Electrical conduit to allow ease of future installation of a Level 2 (240-volt) electric vehicle charging receptacle outlet.