



CITY OF BOULDER Planning and Development Services

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Roofing Inspection and Insulation Guidelines for New & Existing Residential (IRC) & Commercial (IBC) Structures

General Information

- **Permits:** A roofing permit is required for any scope of work repairing, removing, overlaying or recovering more than one square (100 sf) of roofing material. Permits must be obtained prior to work being started – this includes tear-off work. (Roofs for new structures are included in the building permit & permit valuation for the new structure – a separate roofing permit is not required).
 - Roofing permits may be applied for through the [Customer Self-Service \(CSS\) Portal](#).
 - Reroofs of structures with existing solar panels require an approved electrical permit to remove and reinstall panels **prior** to approval of a roofing permit.
 - Reroofs of structures with existing rooftop mechanical equipment require an approved mechanical permit to remove and reinstall the equipment **prior** to approval of a roofing permit.
- **Currently Adopted Codes:** All new roofs must meet 2012 IBC Chapter 15 or 2012 IRC Chapter 9 requirements and the 2017 City of Boulder Energy Conservation Code. Reroofs must currently meet 2012 IBC Section 1510 or 2012 IRC Section R907 requirements and the [2017 City of Boulder Energy Conservation Code](#). Please note, **effective July 1, 2020**, the 2018 IBC/IRC standards and the [2020 City of Boulder Energy Conservation Code](#) standards will apply.
 - **Maximum Number of Roofing Layers:** See 2012 IBC section 1510.3 or 2018 IBC section 1511.3 and 2012 IRC section 907.3 or 2018 IRC section R908.3 for requirements related to recovering vs. replacement. Where the existing roof has two or more applications of any type of roof covering, removal of all existing layers of roof covering is required. Overlays for roofs with a single roofing layer may be permitted with prior approval through a roof pre-inspection and only if the product(s) allow multiple layers.
 - **Material Change:** Where a change of material is proposed (i.e., asphalt shingle to concrete tile) a letter from a Colorado licensed Structural Engineer is required to verify that the existing roof structure is capable of supporting the proposed material.
 - **Wind Speed:** The City of Boulder has adopted local amendments to the IBC regarding wind speed. See 2012 & 2018 IBC, Table 1609.3.1 and the Boulder Revised Code (B.R.C.), [Section 10-5-2\(ff\)](#). In general, roofing material must be able to withstand wind speeds of 120 mph (V_{-asd}) or 150 mph (V_{-ult}) east of Broadway, and 130 mph (V_{-asd}) or 165 mph (V_{-ult}) west of Broadway -- exposure B or C.
 - **Fire Classification:** Class A roofing assembly or an assembly meeting the exceptions listed under 2012 & 2018 IBC 1505.3 or 2012 & 2018 IRC section 902 is required. Manufacturer's listing literature must be submitted at time of permit application for City approval and a copy of the literature must be maintained at the jobsite for the Class A ratings (or exceptions) at mid-roof and final inspection.
 - **Three Tab Shingles:** Three Tab shingles are generally not acceptable unless listed for the wind speeds above. See Tables 1507.2.7.1(1) and 1507.2.7.1(2) of the 2012 IBC and Table 1504.1.1 of the 2018 IBC.

- **Ice & Water Shield:** Not required unless roofing product listing requires it; allowed (under a low-pitch asphalt shingle installation) to substitute for the double underlayment required by 2012 & 2018 IRC R905.2.7.
- **Edge Metal:** Edge metal is required for commercial structures per 2012 IBC Section 1507.2.9.3 or 2018 IBC, Section 1507.2.8.3. For residential structures, edge metal is required by 2012 & 2018 IRC R905.2.8.5 and where/when required by the listing of the roofing product used or proposed to be used.
- **High Wind Nailing:** Required per manufacturer, and hand sealing may be required in low temperatures.
- **Underlayment:** Per manufacturer's requirements for Class A rating, and in compliance with 2012 or 2018 IRC & IBC.
- **Valley Material:** Per manufacturer's requirements.
- **Soffit/Roof Vents:** Soffit vents allowed if located at least five feet from a property line; ventilation is required to be provided in accordance with 2012 & 2018 IRC R806.1 and R806.2; 2012 IBC section 1203 or 2018 IBC section 1202.
- **Flashing:** Flashing, step-flashing and counterflashing required at intersection of roofs & walls, sloped roofs & walls, chimneys, parapets, decks. See 2018 IBC 1503.2 and 2018 IRC R903.2 Drip edge required. Crickets when required by 2012 & 2018 IRC 1003.20.
- **Permit Fees:** Permit fees are based on the valuation of the roofing scope. The valuation includes labor and material costs for the job. A double fee will apply for any roofing work started without a permit.
- **Inspections:** Ladders must be set and fixed for all roof inspections. For job-specific inspection questions, please [contact your inspector](#) after obtaining a roofing permit and scheduling an inspection.
 - A re-inspection fee may be charged if corrections are not made, for missed mid-roof inspections, or a mis-stated roof pitch.
- **Additional Reviews:** All buildings in a [historic district](#) or [designated as an individual landmark](#) require an approved [Landmark Alteration Certificate](#) prior to obtaining a roofing permit.
- **Contractor License Requirement:** Roofing contractors must have the appropriate ICC certification and an active City of Boulder Contractor License in order to apply for permits through our [CSS Portal](#). Contact COBContractorLicense@bouldercolorado.gov for questions regarding contractor licensing.
- **Sheathing:** Roof decks are to be solidly sheathed. Refer to 2012 & 2018 IBC section 1507.2.1 and 2012 & 2018 IRC section R905.2.1. Gaps between sheathing members must be limited to the requirements as identified in the roofing material manufacturer's listing literature. Gaps not exceeding ¼ inch generally meet most manufacturer's specifications.

Inspections

Pre-roof Inspection:

Commercial and Residential Structures

- A Pre-roof inspection is required for overlays, re-covering, or reroofing that does not remove all roofing layers on an existing low-slope commercial roof or residential roof to ensure that the requirements of the 2012 IBC section 1510 or 2018 IRC section 1511 or 2012 IRC section R907 or 2018 IRC section R906 have been met (including, but not limited to, the number of existing layers applied; deterioration or water damage of base layers; weight of additional layers, loading of the roof structure, etc.). Overlays, re-covering, or reroofing is only permitted over one existing roofing layer.
- For commercial structures, a core sample is generally required to determine the number of existing roofing layers and R-value of existing insulation (if any).

- A Colorado licensed engineer **may be required** to provide calculations to show the existing commercial or residential roof structure will support the additional layer of roofing material proposed to be installed.
- When insulation is exposed, insulation levels shall be brought to current standards (see insulation requirements below).
- Aggregate, gravel, or stone used as ballast shall not be replaced after reroofing per Section 1504.8 of the 2012 IBC. Verification from a Structural Engineer is to be provided at the time of permit submittal stating that the removal of the material will not adversely affect the structural design.

Mid-roof Inspection:

Commercial and Residential Structures

- A Mid-roof inspection **may be** required for both commercial and residential roofs depending on the roofing material used, regardless of roof pitch. A mid-roof inspection is also required to verify insulation values (see insulation requirements below) and the nailing strips for tile, slate, clay and asphalt coated metal roofing materials. Additionally, when asphalt shingles are installed, a mid-roof inspection is required on roofs that are less than a 4:12 pitch.

Final Roof Inspection:

Commercial and Residential Structures

- A Final Roof inspection is required for all roofs regardless of pitch, scope of work, or roofing material type.

Insulation Requirements:

Commercial Structures

- Reroofing for commercial structures are exempt from 2017 City of Boulder Energy Conservation Code (COBECC) insulation requirements where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing. Where new tapered insulation is installed above the deck the additional weight is to be verified by a Structural Engineer and letter indicating that the additional weight is acceptable is to be provided at the time of permit application. A roof plan showing the roof pitch, how the roof will be drained and location of roof drains, secondary drains, and scuppers is required at the time of permit submittal.
- In general, the current minimum roof insulation requirement for commercial structures is R-32.9 for insulation entirely above deck, R-50.1 for structures with insulation in attic spaces below deck. See Table C402.2 of the [2017 COBECC](#). After July 1, 2020, the new code minimums for commercial structure roof insulation shall be R-33 for insulation entirely above deck, and R-53 for insulation within attic cavities (see Table C402.1.3) per the [2020 COBECC](#).
- Where new mechanical curbs are required which require lifting of existing mechanical equipment, elevating ductwork, electrical conduit, or gas lines, additional permits may be required. This may also include a Right-of-Way permit if a crane is required.

Residential Structures

- Reroofing for residential structures are exempt from 2017 COBECC insulation requirements where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.

- In general, the current minimum roof insulation requirement for residential structures is R-49. See Table R402.1.2 of the [2017 COBECC](#) and Sections R402.2.1 and R402.2.2 for exceptions. The [2020 COBECC](#) code minimums for residential roof insulation are not proposed to change (see Table R402.1.1).

Code References

B.R.C. 1981, 10-5-2 (cc) International Building Code (IBC) Section 1505.1, "General," is repealed and reenacted to read: 1505.1 General. All roof assemblies and roof coverings required to be listed by this section shall be tested in accordance with ASTM Standard E 108 or UL Standard 790. Class A roofs and the exceptions noted in section 1505.3 for class B roofs as described in this Chapter 15 are the only roof assemblies and roof coverings allowed to be installed on any new or existing building within the city of Boulder. Wood shakes, wood shingles, and wood roof covering materials are prohibited except as provided in Section 10-5-5, "Wood Roof Covering Materials Prohibited," B.R.C. 1981, for certain minimal repairs.

B.R.C. 1981, 10-5-2 (ff), IBC 1609.3 "Basic Wind Speed," is amended by adding the following sentence: The basic design wind speed, V , in mph, for the determination of wind loads shall be determined by Table 1609.3. based on the wind one and building risk category.

B.R.C. 1981, 10-5-5 Wood Roof Covering Materials Prohibited

(a) No person shall install or cause to be installed any wood roof covering materials, including, without limitation, wood shakes or wood shingles. This prohibition includes wood roof covering materials with fire retardant treatments of any kind.

(b) No person owning a building with wood roof covering materials shall fail to remove or cause to be removed from the building all wood roof covering materials before January 1, 2014, and to replace the removed roofing with approved roof covering materials which conform to the *International Building Code* as adopted, and no person shall thereafter take possession or ownership of a building with wood roof covering materials.

(c) The following additional definition applies to this section and to chapter 15 of the building code: "Wood roof covering material" means an exterior surface material used as a top covering and made of wood. "Wood," for the purposes of this definition, means any natural or composite material containing at least fifty percent wood by volume.

B.R.C. 1981 10-9-2(d)(2) Mechanical Equipment Curbs

Flat roofs. On roofs having a pitch of less than 2 in 12, mechanical equipment shall be supported on a solid curb greater in size than the equipment which it serves. Curbs can be manufactured or built-in-place. If built-in-place, the curb shall be covered with metal of at least 26 gauge. All seams and miter corners of the metal shall be riveted and soldered so as to be weather-tight. The curb shall be a minimum of 9 inches above the finished roof.

B.R.C. 1981, 10-5.5-2 (z), R902.1 International Residential Code (IRC), "Roof Covering Materials," is repealed and reenacted to read: R902.1 (y) Section R902.1, "Roof covering materials," is repealed and reenacted to read: All roof covering materials shall be listed as Class A as tested in accordance with UL Standard 790 or ASTM Standard E 108. Roof assemblies with covering of brick, masonry, slate, clay, or concrete roof tile, exposed concrete roof deck, ferrous or copper shingles or sheets, and metal sheets and shingles, shall be considered Class A roof coverings. Unless otherwise specified in this section, roof coverings shall be installed to resist the component and cladding loads specified in table R301.2(2), adjusted for height and exposure in accordance with table R301.2(3).