

## CALIFORNIA ENERGY COMMISSION

## BLUEPRINT

## EFFICIENCY DIVISION

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**Cool Roofs & Condensation**

A cool roof is a roofing material with high thermal emittance and high solar reflectance, or low thermal emittance and exceptionally high solar reflectance that reduces heat gain through the roof. Because cool roofs gain and retain less heat than traditional roofs, less heat is transferred through the envelope into

the building's interior. By lowering internal temperatures, cool roofs reduce occupant demand for air conditioning, allowing for building cooling cost savings.

The temperature of the cool roof is reduced to such an extent that moisture no longer evaporates as it would with a traditional roof. When cool roofs are not installed properly, moisture condenses and becomes trapped within the roofing materials. The trapped moisture can lead to mold growth and damage to the roofing materials or supporting elements.

To prevent the trapping of moist air, it is essential to follow proper air sealing procedures as outlined in [Section 110.7](#) of the 2013 Building Energy Efficiency Standards (Energy Standards). Proper installation may require the installation of: air barriers, vapor barriers, insulation above the roof deck, and additional ventilation.

For more information on cool roofs, please review the U.S. Department of Energy's *Energy Saver* article "Cool Roofs" at: <http://www.energy.gov/energysaver/articles/cool-roofs>.

**Quality Insulation Installation (QII) Compliance Credit for Insulated Headers**

The 2013 Energy Standards provide Quality Insulation Installation (QII) compliance credit for R-2 insulated headers as indicated in [Section RA3.5.6.2.9](#) of the 2013 Reference Residential Appendices (RA). Insulation or wood must fill the cavities, leaving no air gaps in or around the header. To obtain QII credit, use compliance document [CF2R-ENV-21-H](#). Compliance with the R-2 insulated header requirement is verified in Section C, number 13 of this compliance document.

Three options meet the R-2 insulated header requirement:

1. Two-member header with insulation in between. The header and insulation must fill the wall cavity. Example: a 2x4 wall with two 2x nominal headers, or a 2x6 wall with a 4x nominal header and a 2x nominal header. Insulation is required to fill the wall cavity and must be installed between the headers.

2. Single-member header, less than the wall width, with insulation on the interior face. The header and insulation must fill the wall cavity. Example: a 2x4 wall with a 3 1/8" wide header, or 2x6 wall with a 4x nominal header. Insulation is required to fill the wall cavity and must be installed to the interior face of the wall.

3. Single-member header, same width as wall. The header must fill the wall cavity. Example: a 2x4 wall with a 4x nominal header or a 2x6 wall with a 6x nominal header. No additional insulation is required because the header fills the cavity.

Please see the graphic description at:

<http://www.energy.ca.gov/efficiency/blueprint/documents/Headers.pdf>.

## Approved Acceptance Test Technician Certification Providers for Lighting Controls

The Energy Commission has approved the California Advanced Lighting Controls Training Program (CALCTP) and National Lighting Contractors Association of America (NLCAA) as Lighting Controls Acceptance Test Technician Certification Providers.

This action gives the CALCTP and NLCAA authorization to train and certify qualified individuals and employers beyond the interim period established by the 2013 Energy Standards. Individuals

interested in becoming a Certified Lighting Controls Acceptance Test Technician or employer can apply to either of these providers.

Links to both providers' websites are posted on the Energy Commission's web page at: <http://www.energy.ca.gov/title24/attcp>.

## Free Training Opportunities

Free utility sponsored training on the 2013 Energy Standards and compliance software is available across the state.

For upcoming training opportunities, please check the following websites:

- <http://energycodeace.com/>
- <https://pge-web.ungerboeck.com/classcalendar/Search.aspx>
- [www.sdge.com/eic](http://www.sdge.com/eic)
- [www.sce.com/wps/portal/home/business/consulting-services/energy-education-centers](http://www.sce.com/wps/portal/home/business/consulting-services/energy-education-centers)
- <https://www.smud.org/en/business/education-safety/workshops-and-training/index.htm>
- <http://socalgas.com/innovation/energy-resource-center/>

To receive regular information about training and software updates, please sign-up for the Blueprint, Building Standards, and Efficiency list servers at: [www.energy.ca.gov/efficiency/listservers.html](http://www.energy.ca.gov/efficiency/listservers.html).

## Q&A

### Commissioning

#### Do the commissioning requirements apply to additions and alterations?

No, commissioning applies only to newly constructed nonresidential buildings (see [Section 120.8](#)). A newly constructed building is defined in [Section 100.1](#) as: "A building that has never been used or occupied for any purpose."

#### Do the commissioning requirements apply to tenant improvements (first time build-outs) for multi-tenant buildings such as a strip mall?

Possibly, it depends on the local enforcement agency's policy. Commissioning may be completed for the entire building prior to tenant improvements, or for each individual tenant improvement. Check with your local enforcement agency for their commissioning policies for multi-tenant buildings.

#### Do the commissioning requirements apply to unconditioned nonresidential buildings?

No, the scope of the 2013 Energy Standards does not include commissioning ([Section 120.8](#)) for unconditioned nonresidential buildings in [Section 100.0\(e\)2C](#).

**Is third party design review required for buildings with complex systems that serve less than 10,000 square feet?**

No, the licensed professional engineer who completes and signs the Design Review Kickoff Certificate(s) of Compliance, and the Construction Document Design Review Checklist Certificate(s) of Compliance does not need to be a third party (see [Section 10-103\(a\)1](#)).

**Are covered processes required to meet the commissioning requirements?**

No, covered processes are excluded from the commissioning requirements (see [Section 120.8](#)).

Covered processes can be included in the Basis of Design document (see [Section 120.8\(c\)](#)), however it is not required. Please note that the Energy Standards require acceptance testing for certain systems and controls serving covered processes.

For additional information on the commissioning process and requirements, please review the [Nonresidential Compliance Manual](#) and Energy Design Resources' *e-News* #96 "[Commissioning for Code Compliance](#)".

## Nonresidential Economizers

**The 2013 Energy Standards state that each cooling fan system with a total mechanical cooling capacity over 54,000 Btu/hr shall have either an air economizer or a water economizer. Is the term "cooling fan system" referring to the condensing unit (see [Section 140.4\(e\)1](#))?**

No, the term "cooling fan system" is referring to the evaporator coil and fan, not the condensing unit.

**I have a variable refrigerant flow (VRF) air conditioning system, which has four 24,000 Btu/hr fan coils connected to a single 96,000 Btu/hr condensing unit. Is an economizer required in this scenario?**

In this scenario, an economizer is not required because each cooling fan system is 24,000 Btu/hr. An economizer is only required for each cooling fan system, including a VRF, which has a total mechanical cooling capacity over 54,000 Btu/hr.

## Residential Reroof Projects

**Are cool roof requirements triggered for residential reroof projects?**

Cool roof requirements are triggered when more than 50 percent of the exterior surface of the roof is replaced on steep-sloped roofs in Climate Zones 10 through 15, and low-sloped roofs in Climate Zones 13 and 15 (see [Section 150.2\(b\)1H](#)).

For steep-sloped roofs in Climate Zones 10 through 15, a cool roof must be installed with a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum solar reflectance index (SRI) of 16.

Exceptions to the cool roof requirements for steep-sloped roofs include:

- Air-space of 1.0 inch (25 mm) is provided between the top of the roof deck to the bottom of the roofing product; or
- The installed roofing product has a profile ratio of rise to width of 1 to 5 for 50 percent or greater of the width of the roofing product; or
- Existing ducts in the attic are insulated and sealed according to [Section 150.1\(c\)9](#); or
- Buildings with at least R-38 ceiling insulation; or
- Buildings with a radiant barrier in the attic meeting the requirements of [Section 150.1\(c\)2](#); or
- Buildings that have no ducts in the attic; or
- R-4 or greater insulation above the roof deck.

For low-sloped roofs in Climate Zones 13 and 15, a cool roof must be installed with a 3-year aged solar reflectance equal to or greater than 0.63 and a thermal emittance equal to or greater than 0.75, or a minimum SRI of 75.

Exceptions to the cool roof requirements for low-sloped roofs include:

- Buildings that have no ducts in the attic; or

- The aged solar reflectance can be met by using insulation at the roof deck specified in [TABLE 150.2-A](#).

## Luminaire Modifications-in-Place

### When are Luminaire Modification-in-Place requirements triggered?

Luminaire Modification-in-Place requirements, as outlined in [TABLE 141.0-F](#), are triggered when 40 or more luminaires are modified in a building space within a twelve month period, and 10 percent or more of the existing luminaires in an enclosed space are modified.

Compliance with [TABLE 141.0-F](#) is not required if less than 40 luminaires are modified in the building space.

A building space is defined in [TABLE 141.0-F](#) as: a complete single story building; a complete floor of a multi floor building; the entire space in a single tenant under a single lease; or all of the common space in a single building.

An enclosed space is a space that is [substantially surrounded](#) by

solid surfaces, including walls, ceilings or roofs, doors, fenestration areas, and floors or ground.

### I am doing a Luminaire Modification-in-Place project for 40 or more luminaires in a building space. If the luminaires were modified to reduce the wattage and are not dimmable, do the multi-level lighting control requirements apply?

Yes, multi-level lighting controls are required for each enclosed space where 10 percent or more of the luminaires are modified. Multi-level lighting controls are only applicable to the modified luminaires. Two level lighting control can be used if the resulting lighting power is 85 percent or less of the allowed lighting power. Two level lighting control requires each luminaire to have at least one control step between 30 percent and 70 percent of design lighting power in a manner providing reasonably uniform illumination (see [TABLE 141.0-F](#)). Alternatively, the multi-level lighting control requirements in [Section 130.1\(b\)](#) can be met.

If the lighting power were greater than 85 percent of the allowed lighting power, then the requirements in [Section 130.1\(b\)](#) would have to be met.

### I am doing a Luminaire Modification-in-Place project for 40 or more luminaires in a building space. In some of the enclosed spaces, 10 percent or more of the luminaires are modified. What are the applicable control requirements for those enclosed spaces?

If the lighting power is 85 percent or less of the allowed lighting power, per [Section 140.6](#), area controls and shut-off controls are required in the enclosed space(s). Additionally, multi-level lighting controls are required only for luminaires which are Modified-in-Place.

If the lighting power is more than 85 percent of the allowed lighting power, area controls and shut-off controls are required in the enclosed space(s). Additionally, multi-level lighting controls and automatic daylight controls are required only for luminaires which are Modified-in-Place.

The California Energy Commission welcomes your feedback on *Blueprint*. Please contact Andrea Bailey at [Title24@energy.ca.gov](mailto:Title24@energy.ca.gov).

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