



# California Energy Commission

## 2016 Building Energy Efficiency Standards

### What's New for Residential

The most significant changes in the *2016 Building Energy Efficiency Standards* affecting residential buildings include the **new requirements for high-performance insulation within walls and attics**. Other changes include:

#### **Mandatory Measures:**

1. Insulation in roof/ceiling construction must be at least R-22 (maximum U-factor of 0.043) (§ 150.0(a)1).
2. New duct total leakage reduced to 5 percent or less (§ 150.0(m)11B1).
3. All installed air-conditioner and heat pump systems shall be equipped with liquid line filter driers as specified by manufacturer's instructions (§ 150.0(h)3B).
4. Storage hot water heaters no longer need to be externally wrapped (§ 150.0(j)1).
5. All luminaires must be "high-efficacy" (§ 150.0(k)1A).
6. Isolation valves must be installed on instantaneous water heaters that have a minimum input of 6.8 kBTU/hr (§ 110.3(c)7).

#### **Prescriptive Compliance:**

1. Increased flexibility for envelope compliance (§ 150.1(c)).
2. Increased roof assembly requirements to include insulation installed either above or below roof deck (§ 150.1(c)1A).
3. Requirements for water-heating systems in single-family and multifamily buildings have been updated and more options have been added (§ 150.1(c)8).
4. High-performance attics and ducts in conditioned spaces have been added as an option for a space-conditioning distribution system (§ 150.1(c)9).
5. If a whole house fan (WHF) is required, it must comply with a total air flow of at least 1.5 CFM/ft<sup>2</sup> and have 1 square foot of attic vent free area for each 750 CFM (§ 150.1(c)12).

#### **Performance Compliance:**

All compliance software programs that are approved by the Energy Commission must use a single interpretation of the performance compliance rules that the Energy Commission has integrated into the public domain software. More information is available in the *2016 Residential ACM Approval Manual* and the *2016 Residential ACM Reference Manual*.

#### **Additions and Alterations:**

1. Changes to the prescriptive requirements for the building envelope (specifically wall insulation) for additions (§ 150.2(a)1).
2. With alterations, the prescriptive requirements for mechanical cooling, water heating, and lighting have been revised (§ 150.2(b)).
3. More detailed information on additions and alterations in Chapter 9 of the *2016 Residential Compliance Manual*.



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## 2016 Building Energy Efficiency Standards

### What's New for Nonresidential

Changes include:

#### Envelope

1. Revisions to the mandatory requirements for metal framed and demising walls (§ 120.7(b)).
2. Changes to the prescriptive envelope requirements (§ 140.3(a)).
3. Revisions to the roof/ceiling insulation tradeoff for aged solar reflectance (TABLE 140.3 of the Energy Standards).
4. Significant changes to the total skylight area requirement (§ 140.3(c)4).
5. Revisions to the requirements for all fenestration alterations (§ 141.0(b)2A).

#### Lighting

1. Clarification and simplification of existing language; removing exceptions no longer relevant (§ 130.0 through § 130.5 and § 140.6 through § 140.8).
2. Reductions to lighting power density (LPD) values in TABLES 140.6-B, 140.6-C, and 140.6-G.
3. Removal/addition of power adjustment factors (PAFs) (§ 140.6(a)2).
4. Significant reductions in outdoor lighting power allowances (TABLE 140.7-A).
5. Clarification and streamlining of alteration requirements, including addition of a new compliance path that allows compliance by reducing the existing lighting power. For indoor lighting, this path foregoes bi-level control requirements but is otherwise identical to the 85 percent or less of lighting power allowance path.

#### Mechanical

1. Revision of the mandatory requirements for equipment efficiency in TABLES 110.2-A through 110.2-K of the Energy Standards.
2. Interlock controls requirements when operable wall or roof openings are present (§ 140.4(n)).
3. Revisions to fan control system requirements in TABLE 140.4-D of the Energy Standards.
4. Energy management control system (EMCS) to comply with the thermostatic control requirements (§ 120.2(a)).
5. Changes to the requirements for dampers installed on outdoor air supply and exhaust equipment (§ 120.2(f)).
6. New section specifying direct digital controls (DDC) applications and qualifications (§ 120.2(j)).
7. Revisions to the requirements for space conditioning systems with DDC to the zone level (§ 120.2(k)).
8. New general requirements for pipe insulation (§ 120.3(a)).

#### Electrical

1. New definitions of electrical metering, service equipment, plug load, and low voltage dry-type distribution transformer are added to § 100.1.
2. Revisions and clarifications of service electrical metering § 130.5(a), separation of electrical circuits in § 130.5(b), voltage drop in § 130.5(c), and circuit controls in § 130.5(d).

#### Covered Processes

New mandatory requirements for elevators, escalators and moving walkways (§ 120.6(f) and § 120.6(g)).

#### Commissioning

Revisions to language and content to make § 120.8 more clear.