

**NONSUBSTANTIVE ERRATA TO THE
2013 BUILDING ENERGY EFFICIENCY STANDARDS 15-DAY LANGUAGE**

Revised May 31, 2012

Staff proposes the following changes to the 15-Day Language to correct typographical and transcription errors, inadvertent inconsistencies, improve phrasing, and make other improvements that clarify without materially altering the requirements, rights, responsibilities, conditions, or prescriptions contained in the 15-Day Language.

Changes from the 15-Day Language are shown in double-underline for additions and double strike-through for deletions, and in **gray highlight** to distinguish from the 15-Day Language.

1. Part 1, Sections 10-109(h) and (i), p. 23

For Section 10-109(h), the 15-Day Language change was intended to delete only “Executive Director” and insert “Commission”; however, the entirety of 10-109(h) was inadvertently deleted. The 45-Day Language for Section 10-109(h) is restored and the intended 15-Day Language change of deleting “Executive Director” and inserting “Commission” is made. Also, the next section is marked as Section 10-109(i) due to the restoration of Section 10-109(h).

~~(h) In addition to the procedures and protocols identified in the Alternative Calculation Method Approval Manuals and the Reference Appendices, the Executive Director may authorize alternative procedures or protocols that demonstrate compliance with Part 6.~~

(h) In addition to the procedures and protocols identified in the Alternative Calculation Method Approval Manuals and the Reference Appendices, the Executive Director Commission may authorize alternative procedures or protocols that demonstrate compliance with Part 6.

~~(h i) Data Registries And Related Data Input Software, And Electronic Document Repositories.~~

2. Part 6, Section 100.0(e)2Dii, p. 33

Delete a reference to Section 120.7 for low-rise residential buildings, because Section 120.7 is a requirement for Nonresidential and high-rise residential and Hotel/motels.

D. Low-rise residential buildings.

- i. Sections applicable. Sections 150.0 through 150.1 apply to newly constructed low-rise residential buildings.
- ii. Compliance approaches. To comply with ~~Title 24 Part 6~~ Part 6 newly constructed low-rise residential buildings must meet the requirements of:
 - a) Mandatory measures: The applicable provisions of Sections 110.0 through 110.109, ~~120.7~~, and 150.0; and

3. Part 6, Section 100.1, p.40

ASTM C1167 is the American Society for Testing and Materials document entitled "Standard Specification for Clay Roof Tiles," ~~1996~~ 2011 (ASTM C1167-~~96~~11).

4. Part 6, Section 100.1, p.41

Staff inadvertently did not add the following definition. This document was used in the development of the Building Energy Efficiency Standards and is referred to in the documents relied upon.

ASTM C1492, the American Society for Testing and Materials document entitled "Standard Specification for Concrete Roof Tile," 2009 (ASTM C1492-03(2009)).

5. Part 6, Section 100.1- DEFINITIONS, p. 43

The inserted text adds clarity to the definition that was requested by commenters on the 45-Day Language, and makes this definition consistent with that of PROCESS BOILER which also states a value for Btu/h. (see pg. 68).

COMMERCIAL BOILER is a type of boiler with a capacity (rated maximum input) of 300,000 Btus per hour (Btu/h) or more and serving a space heating or water heating load in a commercial building.

6. Part 6, Section 110.2(k), p. 104

Align with the current federal standards in 10-CFR-430 and 10-CFR-431 incorporating the changes to the Final Rule as codified/notified by Federal Register Vol. 73, No. 145, dated July 28, 2008 for applicable small boilers as specified in Table 110.2-K and electronic version of the CFR 431.87 at eCFR.goaccess.gov.

TABLE 110.2-K Gas- and Oil-Fired Boilers, Minimum Efficiency requirements

<u>Equipment Type</u>	<u>Sub Category</u>	<u>Size Category (Input)</u>	<u>Minimum Efficiency^{b,c}</u>	<u>Test Procedure^a</u>
<u>Boiler, hot water</u>	<u>Gas-Fired</u>	<u>< 300,000 Btu/h</u>	<u>80% 82% AFUE</u>	<u>DOE 10 CFR Part 430</u>
		<u>≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h^d</u>	<u>80% E_t</u>	<u>DOE 10 CFR Part 431</u>
		<u>≧ 2,500,000 Btu/h^e</u>	<u>82% E_tE_c</u>	
	<u>Oil-Fired</u>	<u>< 300,000 Btu/h</u>	<u>80% 84% AFUE</u>	<u>DOE 10 CFR Part 430</u>
		<u>≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h^d</u>	<u>80% 82% E_t</u>	<u>DOE 10 CFR Part 431</u>
		<u>≧ 2,500,000 Btu/h^e</u>	<u>84% E_tE_c</u>	
<u>Boiler, steam</u>	<u>Gas-Fired</u>	<u>< 300,000 Btu/h</u>	<u>75-80% AFUE</u>	<u>DOE 10 CFR Part 430</u>
	<u>Gas-Fired – all, except natural draft</u>	<u>≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h^d</u>	<u>79% E_t</u>	<u>DOE 10 CFR Part 431</u>
		<u>≧ 2,500,000 Btu/h^e</u>	<u>79% E_t</u>	<u>DOE 10 CFR Part 431</u>
	<u>Gas-Fired, natural draft</u>	<u>≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h^d</u>	<u>77% E_t</u>	<u>DOE 10 CFR Part 431</u>
		<u>≧ 2,500,000 Btu/h^e</u>	<u>77% E_t</u>	<u>DOE 10 CFR Part 431</u>
	<u>Oil-Fired</u>	<u>< 300,000 Btu/h</u>	<u>80 82% AFUE</u>	<u>DOE 10 CFR Part 430</u>
		<u>≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h^d</u>	<u>81% E_t</u>	<u>DOE 10 CFR Part 431</u>
		<u>≧ 2,500,000 Btu/h^e</u>	<u>81% E_t</u>	<u>DOE 10 CFR Part 431</u>

7. **Part 6, Section 110.3(c)7, p. 111**

This subsection is withdrawn from consideration in its entirety.

7. Showers Heads.

~~A. At least one single shower head must be attached to each shower valve installed directly on each pipe that terminates at a shower. Shower valves heads must be placed no closer than four feet from each other, as measured directly from one shower head valve to the next. Shower heads shall conform to applicable requirements in ASME A112.18.1/CSA B125.1 2011 and must have a rated flow rate of no more than 2.0 gallons per minute at 80 psi. When a shower valve supplies more than one shower head, the shower shall be fitted with a valve or diverter that~~

~~limits the maximum flow rate of the shower to 2.0 gallons per minute. Each mixing valve must supply only one shower head. The piping connecting the shower head to the heater or recirculation loop must be no greater than 1/2 inch at any point.~~

~~EXCEPTION 2 to Section 110.3(c)7A: Showers that recirculate hot water from the drain to the shower head.~~

8. **Part 6, Section 110.10(a)1, p. 128**

Edit the sentence to use language consistent with the Building Energy Efficiency Standards by inserting “enforcement agency” and deleting “authority having jurisdiction”.

~~(a) Buildings listed below shall provide for the future installation of a solar electric or solar thermal system.~~ **Covered Occupancies.**

- 1. Single Family Residences.** ~~Single family residences located in subdivisions with ten or more single family residences and where the application for a tentative subdivision map for the residences has been deemed complete, by the authority having jurisdiction,~~ enforcement agency, on or after January 1, 2014, shall comply with the requirements of Section 110.10(b) through 110.10(e).

9. **Part 6, Section 110.10(c), p. 131**

Edit the sentences for clarity by deleting “or alternate reserved space”. The provision for an alternate reserved space was removed in the 15-Day Language.

(c) Interconnection Pathways.

- ~~The construction documents shall indicate a location for inverters and metering equipment and a pathway for routing of conduit from the solar zone or alternate reserved space to the main point of interconnection with the electrical service panel of the building. For single family residences the point of interconnection will be the main service panel.~~
- ~~The construction documents shall indicate a pathway for routing of plumbing from the solar zone or alternate reserved space to the building’s water-heating system.~~

10. **Part 6, Section 120.1(c)5, p. 135**

Edits are made to clarify the conditions when a zone damper or a supply fan shall be shut off, making these requirements easier to understand and implement. An exception is added to clarify that occupant sensor ventilation control is not required when demand control ventilation is required, because doing so is redundant.

5.- Occupant Sensor Ventilation Control Devices. When occupancy sensor ventilation devices are required by Section 120.2(e)3 or when meeting EXCEPTION 5 to Section 120.1(c)3, occupant sensors shall be used to reduce the rate of outdoor air flow when occupants are not present in accordance with the following:

- A.- Occupant sensors shall meet the requirements in Section 110.9(b)4 and shall have suitable coverage and placement to detect occupants in the entire space ventilated. Occupant sensors controlling lighting may be used for ventilation as long as the ventilation signal is independent of daylighting, manual lighting overrides or manual control of lighting. When a single zone damper or a single zone system serves multiple rooms, there shall be an occupancy sensor in each room and the zone is not considered vacant until all rooms in the zone are vacant.
- B.- One hour prior to normal scheduled occupancy, the occupancy sensor ventilation control shall allow pre-occupancy purge as described in Section 120.1(c)2.
- C.- Within 30 minutes after being vacant following vacancy in all rooms served by a zone damper on a multiple zone system, and ~~the occupant does not require cooling or heating~~ the space temperature is between the heating and cooling setpoints, then no outside air is required and supply air shall be zero.
- D.- Within 30 minutes after being vacant for following vacancy in all rooms served by a single zone system, the single zone system shall cycle off the supply fan when the ~~occupant does not require cooling or heating~~ the space temperature is between the heating and cooling setpoints.
- E. In spaces equipped with an occupant sensor, when vacant during hours of expected occupancy and the occupied ventilation rate required by Section 120.1(b)2 is not provided, then the system or zone controls shall cycle or Operate to maintain the average outdoor air rate over an averaging period of 120 minutes equal to the following:
 - i. For spaces with a design occupant density, or a maximum occupant load factor for egress purposes in the CBC, greater than or equal to 25 people per 1000 ft² (40 square foot or less per person); 25% percent of the rate listed in TABLE 120.1-A.
 - ii. For spaces with a design occupant density, or a maximum occupant load factor for egress purposes in the CBC, less than 25 people per 1000 ft² (more than 40 square foot per person); 50% percent of the rate listed in TABLE 120.1-A.

Exception to 120.1(c)5. If Demand Control Ventilation is implemented as required by Section 120.1(4).

11. **Part 6, Section 120.2(e)3, p. 138**

The square footage specification for multipurpose rooms is correcting an obvious typographical error from 100 ft² to 1000 ft².

3. Multipurpose room less than 100-1000ft², cClassrooms greater than 750 ft² and conference, convention, auditorium and meeting center rooms greater than 750 ft² that do not have processes or operations that generate dusts, fumes, vapors or gasses shall be equipped with occupant sensor(s) to accomplish the following during unoccupied periods:

- A. Automatically setup the operating cooling temperature set point by 2°F or more and setback the operating heating temperature set point by 2°F or more; and
- B. Automatically reset the minimum required ventilation rate with an occupant sensor ventilation control device according to Section 120.1(c)5.

12. **Part 6, Section 120.2(i)5, p. 139-140**

For the 15-Day Language, these requirements were moved from NA9 to Section 120.2. The language was incorrectly copied during the transfer of the text.

5. The controller shall provide system status by indicating the following conditions:

- ~~A. Air temperature sensor failure/fault~~
- ~~B. Not economizing when it should~~
- ~~C. Economizing when it should not~~
- ~~D. Damper not modulating~~
- ~~E. Excess outdoor air~~

- A. Free cooling available
- B. Economizer enabled
- C. Compressor enabled
- D. Heating enabled
- E. Mixed air low limit cycle active

13. **Part 6, Section 120.6(c)5, p. 152**

The deletion of “is scheduled to be” is a mistake. This edit was made under the assumption that it adds clarity and is being withdrawn. This requirement is deliberately written to mean that there is a minimum ventilation requirement in enclosed parking garages during each period of time that the garage is expected to be occupied. The restored language is:

5. The ventilation rate shall be at least 0.15 cfm/ft² when the garage is ~~scheduled to be~~ scheduled to be occupied.

14. **Part 6, Section 120.6(e), p. 153-154**

This section of 15-Day Language has been formatted incorrectly so that the requirements proposed in 45-Day Language have been misplaced. The result of this mis-formatting is that it creates an unintended mandatory requirement for variable speed compressors that was never intended in the 45-Day Language. The criterion for one or more variable speed compressors is one of two options available under the trim compressor and storage subsection of Section 120.6(e).

There are also two mistakes in the 15-Day Language in subsection 1, where (1) some of the requirements of 120.6(e)1B were also included in 120.6(e)1A, and (2) the extraneous words "total capacity" make the requirement to satisfy the first Exception to Section 120.6(e)1 unintelligible.

All new compressed air systems, and all additions or alterations of compressed air systems where the total combined online horsepower (hp) of the compressor(s) is 25 horsepower or more, shall meet the requirements of Subsections 1 through 3. These requirements apply to the compressors and related controls that provide compressed air and do not apply to any equipment or controls that use or process the compressed air.

EXCEPTION to Section 120.6(e): Alterations of existing compressed air systems that include one or more centrifugal compressors.

1. **Trim Compressor and Storage.** The compressed air system shall be equipped with an appropriately sized trim compressor and primary storage to provide acceptable performance across the range of the system and to avoid control gaps. The compressed air system shall comply with subsection A. or B below

~~The compressed air system shall include one or more variable speed drive (VSD) compressors. For systems with more than one compressor, the total combined capacity of the VSD compressor(s) acting as trim compressors must be at least 1.25 times the largest net capacity increment between combinations of compressors. The compressed air system shall include primary storage of at least one gallon per actual cubic feet per minute (acfm) of the largest trim compressor; or, i. The compressed air system shall be equipped with an appropriate sized trim compressor and primary storage to provide acceptable performance across the range of the system and to avoid control gaps.~~

- A. ~~ii.~~ The compressed air system shall include one or more variable speed drive (VSD) compressors. For systems with more than one compressor, the total

combined capacity of the VSD compressor(s) acting as trim compressors must be at least 1.25 times the largest net capacity increment between combinations of compressors. The compressed air system shall include primary storage of at least one gallon per actual cubic feet per minute (acfm) of the largest trim compressor; or, ~~Compressed air systems with more than one compressor online shall include a compressor or set of compressors with total effective trim capacity at least the size of the largest net capacity increment between combinations of compressors.~~

A.B. The compressed air system shall include a compressor or set of compressors with total effective trim capacity at least the size of the largest net capacity increment between combinations of compressors, or the size of the smallest compressor, whichever is larger. The total effective trim capacity of single compressor systems shall cover at least the range from 70 percent to 100 percent of rated capacity. The effective trim capacity of a compressor is the size of the continuous operational range where the specific power of the compressor (kW/100 acfm) is within 15 percent of the specific power at its most efficient operating point. The total effective trim capacity of the system is the sum of the effective trim capacity of the trim compressors. The system shall include primary storage of at least 2 gallons per acfm of the largest trim compressor.

EXCEPTION 1 to Section 120.6(ee)1: Compressed air systems in existing facilities that are ~~adding~~ ~~adding~~ or replacing less than 50% percent of the ~~total capacity~~ online capacity of the system.

15. **Part 6, Section 120.7(b), p.155**

The U-factor in TABLE 140.3-C is inconsistent with the narrative in Section 120.7(b)2.

2. **Metal Framed-** The weighted average U-factor of the wall assembly shall not exceed ~~0.098.~~ 0.105.

16. **Part 6, Section 120.7(b)6, p.155**

To make the language consistent with the Table 4.3.8 in Reference Joint Appendix JA-4

6. **~~Class~~ Spandrel Panels and Glass Curtain Wall-** The weighted average U-factor of the Glass spandrel panels and glass curtain wall assembly shall not exceed 0.280.;

17. **Part 6, Section 120.9, p. 158**

The inserted text adds clarity to the definition that was requested by commenters on the 45- Day Language, and makes this definition consistent with that of PROCESS BOILER (see pg. 68).

(a) Combustion air positive shut-off shall be provided on all newly installed boilers as follows:

1. All boilers with an input capacity of 2.5 MMBtu/h (2,500,000 Btu/h) and above, in which the boiler is designed to operate with a non-positive vent static pressure for negative or zero pressure operation.

(c) Newly installed boilers with an input capacity of 5 MMBtu/h (5,000,000 Btu/h) and greater shall maintain excess (stack-gas) oxygen concentrations at less than or equal to 5.0% percent by volume on a dry basis over firing rates of 20 percent to 100 percent the entire firing range. Combustion air volume shall be controlled with respect to firing rate or flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited.

18. **Part 6, Section 140.3(a)5B, p.193**

Automatic controls was moved from Item (IV) "original language" to Item (I) under the same exception to improve language flow and eliminate confusion.

B. Have an area-weighted average a U-factor no greater than the applicable value in TABLE 140.3--B, C, or D, ~~or~~

EXCEPTION to Section 140.3(a)5B: For vertical fenestration containing chromogenic type glazing:

(I) the lower-rate labeled U-factor shall be used to with automatic controls to modulate the amount of U-factor heat flow into the space in multiple steps in response to solar intensity to demonstrate compliance with this section;

(II) Chromogenic glazing shall be considered separately from other fenestration; and

(III) area-weighted averaging with other fenestration that is not chromogenic shall not be permitted.

~~(IV) Chromogenic glazing shall be automatically controlled to modulate the amount of U-factor into the space in multiple steps in response to daylight levels or solar intensity.~~

C. Have an area-weighted average Relative Solar Heat Gain Coefficient, RSHGC, excluding the effects of interior shading, no greater than the applicable value in Table 140.3 B, C or D.

19. **Part 6, Section 140.3(a)5C, p.193**

Automatic controls was moved from Item (IV) "original language" to Item (I) under the same exception to improve language flow and eliminate confusion.

EXCEPTION 2 to Section 140.3(a)5C: For vertical fenestration containing chromogenic type glazing:

(I) the lower-rate labeled RSHGC shall be used ~~to~~ with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to solar intensity to demonstrate compliance with this section;

(II) Chromogenic glazing shall be considered separately from other fenestration; and

(III) area-weighted averaging with other fenestration that is not chromogenic shall not be permitted.

~~(IV) chromogenic glazing shall be automatically controlled to modulate the amount of solar heat gain into the space in multiple steps in response to solar intensity.~~

~~For Fenestration containing dynamic glazing, the lowest rated labeled SGHC shall be used to demonstrate compliance with this section. Dynamic glazing shall be considered separately from other fenestration and area-weighted averaging with other fenestration that is not dynamic shall not be permitted.~~

20. **Part 6, Section 140.3(a)5D, p.194**

Automatic controls was moved from Item (IV) "original language" to Item (I) under the same exception to improve language flow and eliminate confusion.

EXCEPTION 3 to Section 140.3(a)5D: ~~When the~~ For vertical fenestration containing chromogenic type glazing:

(I) the higher-rate labeled VT shall be used ~~to~~ with automatic controls to modulate the amount of light transmitted into the space in multiple steps in response to solar intensity to demonstrate compliance with this section;

(II) ~~C~~chromogenic glazing shall be considered separately from other fenestration; and

(III) area-weighted averaging with other fenestration that is not chromogenic shall not be permitted.

~~(IV) Cchromogenic glazing shall be automatically controlled to modulate the amount of light transmitted into the space in multiple steps in response to daylight levels or solar intensity.~~

~~For fenestration containing dynamic glazing, the highest rated labeled VT listed on the fenestration's label (pursuant to Section —) VT shall be used to demonstrate assess compliance with this section. Dynamic glazing shall be considered separately from~~

~~other fenestration and area-weighted averaging with other fenestration that is not dynamic shall not be permitted.~~

21. **Part 6 Section 140.3(a)6C, p. 195**

The words higher for SHGC and lower for VT were unintentionally reversed. Correcting the words makes the language consistent with the chromogenic type glazing in Sections 140.3(a)5B, 140.3(a)5C, and 140.3(a)5D.

EXCEPTION to Section 140.3(a)6C: For skylights containing chromogenic type glazing: (I) the ~~higher-lower-rated~~ labeled SHGC shall be used to demonstrate compliance with this section; (II) chromogenic glazing shall be considered separately from other skylights; and (III) area-weighted averaging with other skylights that is not chromogenic shall not be permitted.

22. **Part 6 Section 140.3(a)6D, p. 196**

The words higher for SHGC and lower for VT were unintentionally reversed. Correcting the words makes the language consistent with the chromogenic type glazing in Sections 140.3(a)5B, 140.3(a)5C, and 140.3(a)5D.

EXCEPTION to Section 140.3(a)6D: For skylights containing chromogenic type glazing: (I) the ~~lower~~ higher-rated labeled VT shall be used to demonstrate compliance with this section; (II) chromogenic glazing shall be considered separately from other skylights; and (III) area-weighted averaging with other skylights that are ~~is~~ not chromogenic shall not be permitted.

23. **Part 6, Section 140.3(a)8 Table 140.3-D , p. 207**

Reformatted table for clarity. Consolidated the RSHG to 0.26 rows for all Window Wall Ratios to one row and remove the % values WWR. The RSHGC of 0.26 is the same for all WWR percentages and therefore redundant.

Windows Windows of all buildings	Relative Solar Heat Gain Relative Solar Heat Gain
<u>U-factor</u>	<u>Maximum U-factor 0.47</u>
<u>RSHGC</u>	<u>Maximum RSHGC 0.26</u>
0-10% WWR	Maximum RSHGC Relative Solar Heat gain <u>0.2636</u>
11-20% WWR	Maximum RSHGC Relative Solar Heat gain <u>0.2631</u>
21-30% WWR	Maximum RSHGC Relative Solar Heat gain <u>0.26</u>
31-40% WWR	<u>Maximum RSHGC 0.26</u>

24. **Part 6, Section 140.4(e)4D, p. 217**

The correct specification for a “fixed enthalpy + fixed dry-bulb” high-limit economizer control device was incorrectly described as a “fixed enthalpy” control device. Fixed enthalpy control devices are no longer allowed as an acceptable high-limit control device. This correction to the 15-Day Language will make Section 140.4(e)4D consistent with Table 140.4B:

ED. Adjustable setpoint. If the high-limit control is fixed dry-bulb~~7~~ or fixed enthalpy ~~±~~ fixed dry-bulb~~±~~ it then the control shall have an adjustable setpoint.

25. **Part 6, Section 141.0, TABLE 141.0-B, p. 266**

Edits made to Table 141.0-B, Roof/Ceiling Insulation Tradeoff for Aged Solar Reflectance, to clarify and simplify its use. Specifications provided in Table 141.0-B are now consistent with the specifications of roof and ceiling insulation in Table 141.0-C, which sets requirements based on climate zones and not building frame types. These modifications do not change the stringency of the Standards.

The energy benefits associated with cool roofs are specified in provisions for the aged solar reflectance of roofing products in the Building Energy Efficiency Standards (Standards). The aged solar reflectance values for low-sloped roofs in new nonresidential buildings are specified in Section 140.3 and are specified for alterations made to existing nonresidential buildings in Section 141.0. To help the roofing industry with flexible ways of meeting these requirements Energy Commission staff included an insulation tradeoff tables (i.e., Table 140.3 and Table 141.0-B) in the proposed 45-Day Language. Each table allows increasing R-values of above deck insulation to be used in lieu of lower aged solar reflectance values.

Modifications were made to these tables for the 15-Day Language that responded to further recommendations by the roofing industry allowing tradeoffs for insulation installed below the roof deck as opposed to solely insulation above the roof deck with lower aged solar reflectances. This tradeoff was accomplished by revising Table 141.0-B in the 15-Day Language to specify roof assembly U-factors as opposed to R-value of above deck insulation. U-factor represents thermal resistance of the entire assembly while R-value only applies to the insulation material within an assembly. The energy equivalent U-factor replaced the prior energy measure expressed as an R-value.

As an example, the 45-Day Language specified an R-value and the location of where the insulation would be placed. However, specifying a U-factor in 15-Day Language allows insulation material to be installed anywhere within the assembly provided the required U-factor is not exceeded. The substantive obligation to meet the specified energy requirement did not change from 45-Day Language to 15-Day Language, rather the manner in which this energy requirement was expressed for building design purposes.

This provides greater flexibility for the roofing industry to comply with the Standards. Table 141.0-B in the 15-Day Language includes columns based on two different frame types: metal and wood. U-factor specifications in each column differ by climate zone. U-factor specifications for climate zones 2 and 10-16 for metal and wood frame are identical; whereas the U-factor specifications for climate zones 1 and 3-9 for metal and wood frame have minor differences that result in insignificant overall energy use for the building. The inconsequential differences by frame types allows the removal of the frame type distinction while maintaining a single set of roof/ceiling U-factor tradeoff requirements for lower specified aged solar reflectances. This helps to increase clarity and facilitate use of Table 141.0-B, and does not alter the energy impact of the proposed requirement.

The energy savings resulting from the proposed requirements of this table did not change between those originally prescribed in proposed revisions for the 45-Day Language and the 15-Day Language. The 15-Day Language proposed revisions based on U-factor and the proposed nonsubstantive errata capture the same energy savings as the proposed 45-Day Language. The 15-Day Language proposed revisions for this table result in greater flexibility for the roofing installer to meet the intent of the aged solar reflectance requirement—insulation can be installed above, below or any given combination of above and below roof deck so long as the required maximum specified U-factor is met for the specified solar reflectance.

Staff is proposing further clarification to Table 141.0-B to simplify its use without compromising the estimated energy savings that would accrue for these requirements. Specifications provided in Table 141.0-B are based on a complementary table for specifications of roof and ceiling insulation in Table 141.0-C. To improve consistency between the formats of each table staff is proposing as a non-substantive errata to eliminate building frame type as a category in Table 141.0-B. No wording in the body of the proposed language of Section 141.0 would be changed and the proposed nonsubstantive errata would not result in any change to the intent or stringency of measures required between the proposed requirements of the 45-Day and 15-Day Language.

Table 141.0-B Roof/Ceiling Insulation Tradeoff for Aged Solar Reflectance

<u>Nonresidential</u>				
<u>Aged Solar Reflectance</u>	<u>Metal Building Climate Zone 1, 3-9 U-factor</u>	<u>Metal Building Climate Zone 2, 10-16 U-factor</u>	<u>Wood Framed and Other Climate Zone 1, 3-9 U-factor</u>	<u>Wood Framed and Other Climate Zone 2, 10-16 U-factor</u>
<u>0.62- 0.60</u>	<u>0.075</u>	<u>0.052</u>	<u>0.069</u>	<u>0.052</u>
<u>0.59-0.55</u>	<u>0.066</u>	<u>0.048</u>	<u>0.062</u>	<u>0.048</u>
<u>0.54-0.50</u>	<u>0.060</u>	<u>0.044</u>	<u>0.056</u>	<u>0.044</u>
<u>0.49-0.45</u>	<u>0.055</u>	<u>0.041</u>	<u>0.051</u>	<u>0.041</u>
<u>0.44-0.40</u>	<u>0.051</u>	<u>0.039</u>	<u>0.048</u>	<u>0.039</u>
<u>0.39-0.35</u>	<u>0.047</u>	<u>0.037</u>	<u>0.044</u>	<u>0.037</u>
<u>0.34-0.30</u>	<u>0.044</u>	<u>0.035</u>	<u>0.042</u>	<u>0.035</u>
<u>0.29-0.25</u>	<u>0.042</u>	<u>0.034</u>	<u>0.039</u>	<u>0.034</u>

26. **Part 6, Section 141(b)2B iii, Table 141.0-C and Table 4.2.2, p. 268**

The U-factor value in Table 141.0-C has been changed to be consistent with the U-factor value in Reference Joint Appendix Table 4.2.2

TABLE 141.0-CB INSULATION REQUIREMENTS FOR ROOF ALTERATIONS

<u>Climate Zone</u>	<u>Nonresidential</u>		<u>High-Rrise Residential and Guest Rooms of Hotel/Motel Buildings</u>	
	<u>Continuous Insulation R-value</u>	<u>U-factor</u>	<u>Continuous Insulation R-value</u>	<u>U-factor</u>
<u>1</u>	<u>R-8</u>	<u>0.081-0.082</u>	<u>R-14</u>	<u>0.055</u>
<u>2</u>	<u>R-14</u>	<u>0.055</u>	<u>R-14</u>	<u>0.055</u>
<u>3-9</u>	<u>R-8</u>	<u>0.081-0.082</u>	<u>R-14</u>	<u>0.055</u>
<u>10-16</u>	<u>R-14</u>	<u>0.055</u>	<u>R-14</u>	<u>0.055</u>

27. **Part 6, Section 141.0(b)3B, p. 277**

Added “the” to match the language in 150.2(b)2B:

B. When the altered components do not meet the requirements specified in the sections that are stated in subsections i through viii, the standard energy budget (energy budget) shall be based on the requirements stated in those sections as follows: The standard design for an altered component shall be the higher efficiency of existing conditions or the requirements stated in Table TABLE 141.0-€D. For components not being altered, the standard design shall be based on the existing conditions. When the third party verification option is specified, all components proposed for alteration must be verified. The Executive Director shall determine the qualifications required by the third party inspector.

28. **Part 6, Section 150.0(j)4, p. 287**

This subsection is withdrawn in its entirety.

~~54. — The maximum length per dwelling unit of 1 inch (25 mm) diameter piping in a non-recirculating system providing domestic hot water distribution system shall be limited to a total length of 15 feet (4.5 m).
EXCEPTION 1 to Section 150150.0(j)54: A dedicated 1 inch (25 mm) diameter line feeding a high flow tub fixture (or tub fixtures) can be installed provided all other fixtures meet the requirement of 150150.0(j)54.~~

29. **Part 6, Section 150.1(b)1, p. 303**

Edit corrects an error in that lighting is a mandatory measure and has never been included in the energy budget calculation.

1. **Energy Budget for the Standard Design Building.** The energy budget for a Standard Design Building is determined by applying the mandatory and prescriptive requirements to the Proposed Design Building. The energy budget is the sum of the TDV energy for space-conditioning, lighting, mechanical ventilation and water heating.

30. **Part 6, Section 150.1(c)3A, p. 307**

Automatic controls was moved from Item (IV) “original language” to Item (I) under the same exception to improve language flow and eliminate confusion. Corrected SHGC acronym.

EXCEPTION 3 to Section 150.1(c)3A: For fenestration containing chromogenic type glazing:

(I) the lower-rated labeled U-factor and SHGC/SGHC shall be used ~~to~~with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to solar intensity to demonstrate compliance with this section;

(II) Chromogenic glazing shall be considered separately from other fenestration; and

(II) area-weighted averaging with other fenestration that is not chromatic shall not be permitted and shall be determined in accordance with Section 110.6(a).

~~(IV) Chromogenic glazing shall be automatically controlled to modulate the amount of solar gain and light transmitted into the space in multiple steps in response to daylight levels or solar intensity.~~

~~For Fenestration containing dynamic glazing, the lowest rated labeled U-factor and SGHC shall be used to demonstrate compliance with this section. Dynamic glazing shall be considered separately from other fenestration and area-weighted averaging with other fenestration that is not dynamic shall not be permitted and shall be determined in accordance with Section 110.6(a).~~

31. **Part 6, EXCEPTION to Section 150.2(b), p. 330**

This exception is deleted due to the withdrawal of Section 110.3(c)7.

~~EXCEPTION to Section 150.2(b): Showers do not need to meet Section 110.3(c)7.~~

32. **Part 6, Section 150.2(b)1B, p. 331**

Removed “in the same orientation and tilt” because it is redundant with “existing wall or roof”. The existing language “existing wall or roof” covers all orientations and tilts.

- C. **Replacement Fenestration:** Replacement of fenestration, where existing fenestration area in an existing wall or roof is replaced with a new manufactured fenestration product in the same orientation, tilt and up to the total fenestration area removed in the existing wall or roof, the replaced fenestration shall meet the U-factor and Solar Heat Gain Coefficient requirements of Sections 150.1(c)3A, 150.1(c)4, and TABLE 150.1-A.

33. **Part 6, EXCEPTION to Section 150.2(b)1, p. 336**

This exception is deleted due to the withdrawal of Section 110.3(c)7.

~~EXCEPTION to Section 150.2(b)1 Shower Heads: Alterations in which the hot water supply piping between the water heater (or recirculation loop) and the bathroom is not moved or replaced.~~

34. **Part 6, EXCEPTION to Section 150.2(b)2A, p. 336**

This exception is deleted due to the withdrawal of Section 110.3(c)7.

~~EXCEPTION to Section 150.2(b)2A Shower Heads: Alterations in which the hot water supply piping between the water heater (or recirculation loop) and the bathroom is not moved or replaced.~~

35. **Part 6, Joint Appendix, JA1, p. 1-7**

ASTM C1167 is the American Society for Testing and Materials document entitled "Standard Specification for Clay Roof Tiles," ~~1996~~ 2011 (ASTM C1167-~~96~~11).

36. **Part 6, Joint Appendix, JA1, p. 1-7**

Missing reference added

ASTM C1492 is the American Society for Testing and Materials document entitled "Standard Specification for Concrete Roof Tile," 2009 (ASTM C1492-03(2009))

37. **Part 6, Residential Appendix, RA3.5.6, p. 3-49**

Change a typographical error in the thickness for closed cell spray foam to 2 inches from 1.5 inches to be consistent with the Joint Appendix JA-4 and the body of this document.

-- Closed cell spray polyurethane foam with a minimum density of 2.0 pcf and a minimum thickness of ~~1½ inches~~ 2 inches.

38. **Part 6, Residential Appendix, RA3.5.6, p. 3-71 to 3-78**

Section titles were inadvertently struck out for the following Section Numbers (Pages RA3-71 through RA3-78):

Page 3-71 RA3.5.6.1.1 oc SPF

Page 3-75 RA3.5.6.2.1 Narrow Framed Cavities

- Page 3-75 RA3.5.6.2.3 Special Situations--Obstructions
- Page 3-76 RA3.5.6.2.4 Special Situations--Rim Joists
- Page 3-77 RA3.5.6.2.7 Special Situations--Double Walls and Framed Bump-Outs
- Page 3-77 RA3.5.6.2.8 Special Situations--Structural Bracing, Tie Downs, Steel Structural Framing
- Page 3-78 RA3.5.6.3.1 Special Situations--Enclosed Rafter Ceilings
- Page 3-78 RA3.5.6.3.2 Special Situations--Attics and Cathedral Ceilings
- Page 3-78 RA3.5.6.3.3 Special Situations--HVAC Platform
- Page 3-78 RA3.5.6.3.4 Special Situations--Attic Access

39. **Part 6, Residential Appendix, RA3.5.6.1.3, p. 3-74**

Remove item 16 as it is a duplicate and renumber 17 to 16

~~16. All recessed light fixtures that penetrate the ceiling shall be listed for zero clearance insulation contact (IC), have a label that certifies it as airtight with leakage less than 2.0 cfm @ 75 Pa when tested to ASTM E283, and shall be sealed with a gasket or caulk between the light's housing and the ceiling.~~
~~1716.....~~

40. **Part 6, Residential Appendix, RA4.4.21, p. 4-23**

Edited to be consistent with the Building Energy Efficiency Standards by inserting "shall" and deleting "must".

1. The collectors ~~must~~shall face within 35 degrees of south and be tilted at a slope of at least 3:12. ~~The system shall be SRCC certified.~~

41. **Part 6, Nonresidential Appendices NA6, p. 6-2**

The following sentence was deleted because it is redundant.

~~The default U-factor shall be determined using the following equation.~~

42. **Part 11 Energy Efficiency Divisions of the Voluntary Measure Appendices A4.2 and A5.2**

The Energy Efficiency Divisions of the Voluntary Measure Appendices A4.2 and A5.2 are withdrawn in their entirety.