CALIFORNIA ENERGY COMMISSION 1516 Ninth Street Sacramento, California 95814

Main website: www.energy.ca.gov

ADOPTED BUILDING STANDARDS

OF THE CALIFORNIA ENERGY COMMISSION:

CALIFORNIA CODE OF REGULATIONS, TITLE 24,

PARTS 1 and 6 (CALIFORNIA ENERGY CODE)

CALIFORNIA ENERGY COMMISSION

DOCKET NUMBER 12-BSTD-1:

2013 BUILDING ENERGY EFFICIENCY STANDARDS

SUPPLEMENT TO NONSUBSTANTIAL ERRATA TO THE 2013 BUILDING ENERGY EFFICIENCY STANDARDS 15-DAY LANGUAGE

Revised December 17, 2012

As directed by the Energy Commission in Order No. 12-0531-5 Adopting the 2013 Building Energy Efficiency Standards and Negative Declaration, the Executive Director makes the following nonsubstantial changes to the regulations as adopted on May 31, 2012, 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 regulations.

Changes from the adopted regulations are shown in double-underline for additions and double strike-through for deletions, and in gray highlight to distinguish from the 15-Day Language that was made available for public comment on May 15, 2012, and subsequently adopted.

These changes make corrections on the 15-day page numbers, and the final page numbers, which are **shown in red.**

1. GLOBAL CORRECTIONS

Spelling, spacing, typographical, grammatical, numbering, references, and formatting errors have been corrected.

2. PART 1, DEFINITIONS, P. 5 4

COMPLEX MECHANICAL SYSTEMS … Tables 112-A, 112-B, 112-C, and 112-E of the Mechanical Code, that each serve one zone, or two-pipe, heating only systems serving one or more zones

3. PART 1, SECTION 10-114, P. 30 25

TABLE 10-114-A Statewide Default Location

Reference dates corrected.

Rural areas, as defined by the ~~2000~~ 2010 U.S. Census.

Urban areas, as defined by the ~~2000~~ 2010 U.S. Census.

4. PART 6, SECTION 100.1(B), P. 40 35

ASTM is the American Society for Testing and Materials / International.

5. PART 6, SECTION 100.1(B), P. 45 39

Proposed 45-Day Language changes to definition re-inserted to match Reference Joint Appendix JA1.

DEMAND RESPONSE PERIOD is a period of time during which electricity loads are modified in response to a demand response signal.

6. PART 6, SECTION 100.1, P. 45 39

Restored definition fragment erroneously deleted and clarify that process load is also excluded from the directly conditioned space definition.

CONDITIONED SPACE, DIRECTLY is an enclosed space that is provided with wood heating, is provided with mechanical heating that has a capacity exceeding 10 Btu/hr-ft^2), or is provided with mechanical cooling that has a capacity exceeding 5 Btu/hr-ft^2, unless the space-conditioning system is designed for process space or process load. (See "process load" and "process space ")

7. PART 6, SECTION 100.1, P. 46 40

Definition edited for clarity.

DOOR is an operable opening in the building envelope ~~that is not a fenestration product component~~ , including swinging and roll-up doors, fire doors, and access hatches~~.~~ with less than 50 percent glazed area. When that operable opening has 50 percent or more glazed area it is ~~fenestration~~ a glazed door. See Fenestration: Glazed Door. ~~Doors with a glazed area, see Glazed Door.~~
~~Doors that are more than one-half glass in area are considered a fenestration product glazed door.~~

8. PART 6, SECTION 100.1, P. 49 42

Definition edited for clarity.

GLAZED **DOOR** is an exterior door ~~fenestration product in an exterior door~~ having a glazed area of 50 percent or greater of the area of the door.

9. PART 6, SECTION 100.1, P. 51 43

Definition removed from this section.

~~**U-FACTOR, FENESTRATION** is the overall coefficient of thermal transmittance of a construction assembly, inBtu/(hr x ft² x °F), including air film resistance at both surfaces.~~

10. PART 6, SECTION 100.1, P. 51 43

Definition added.

TINTED GLASS is colored glass by incorporation of a mineral admixture resulting in a degree of tinting. Any tinting reduces both visible and radiant transmittance.

11. PART 6, SECTION 100.1, P. 69 56 AND JA1- 55 - 37

Definition added. This definition and several references to the term (see pages 32, 33, 36, and 44)(27, 28, 31, 38) were inadvertently removed in 45-day language. This definition has been restored to be consistent with its use in the standards.

PROCESS SPACE is a space that is thermostatically controlled to maintain a process environment temperature less than 55º F or to maintain a process environment temperature greater than 90º F for the whole space that the system serves, or that is a space with a space-

conditioning system designed and controlled to be incapable of operating at temperatures above 55º F or incapable of operating at temperatures below 90º F at design conditions.

12. PART 6, SECTION 100.1, P. 74 60

Definition edited for clarity.

U-FACTOR~~, ENVELOPE~~ is the overall coefficient of thermal transmittance of a fenestration, wall, floor, ~~or~~ roof or ceiling component ~~construction assembly~~, in Btu/(hr x ft² x °F), including air film resistance at both surfaces.

13. PART 6, SECTION 100.1, P. 75 60

Definition edited for grammar and to match JA1.

WATER BALANCE IN EVAPORATIVE COOLING TOWERS ~~is t~~The water balance of a ~~in~~ cooling towers ~~is~~:

14. PART 6, SECTION 110.2(e) P.82 66

Grammar corrected.

(e) ~~**Evaporative orand**~~ **Open and Closed Circuit Cooling Towers.** All open and closed circuit ~~evaporative orand open~~ cooling towers installations shall comply with the following:

15. PART 6, SECTION 120.1 (c)5 E(ii), P. 136 100

The text in this section was clarified to ensure that occupant sensor controls used to limit the outdoor air flow rate are applied consistently whenever they are required to be installed, regardless of the design occupancy of the space.

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:~~ 25 percent of the rate listed in TABLE 120.1-A.

~~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.~~

16. PART 6, SECTION 120.2(e)3., P. 138 103

This item was added to clarify that occupancy sensor controls are only required if the space is not already required to implement Demand Control Ventilation. This addition is consistent with the exception listed in 120.1(c)5. that references how occupancy sensor control devices must be applied.

Exception 5 to Sections 120.2(e)3:. If Demand Control Ventilation is implemented as required by Section 120.1(c) 3 and 120.1(c)4.

17. PART 6, SECTION 140.3, TABLE 140.3-A, P. 198 146

Change to be consistent with RA3.5.3 Definitions.

TABLE 140.3-A MATERIALS DEEMED TO COMPLY = WITH SECTION 140.3(a)9A

	MATERIALS AND THICKNESS		MATERIALS AND THICKNESS
1	Plywood – min. 3/8 inches thickness	9	Built up roofing membrane
2	Oriented strand board – min. 3/8 inches thickness	10	Modified bituminous roof membrane
3	Extruded polystyrene insulation board – min. ½ inches thickness	11	Fully adhered single-ply roof membrane
4	Foil-back polyisocyanurate insulation board – min. ½ inches thickness	12	A Portland cement or Portland sand parge, or a gypsum plaster, each with min. 5/8-inches thickness
5	Closed cell spray foam with a minimum density of 2.0 pcf and a min. ~~1½~~ 2.0 inches thickness	13	Cast-in-place concrete, or precast concrete
6	Open cell spray foam with a density no less than 0.4 pcf and no greater than 1.5 pcf, and a min. 5½ inches thickness	14	Fully grouted concrete block masonry
7	Exterior or interior gypsum board min. 1/2 inches thickness	15	Sheet steel or sheet aluminum
8	Cement board – min. 1/2 inches thickness		

18. PART 6, SECTION 120.6(b), P. 152 114

This item was deleted in the 15-day language in JA7 but was inadvertently left in this section. This item is now removed in its entirety.

~~5. **Commercial Refrigeration System Acceptance.** Before an occupancy permit is granted for a new retail food store, or before a new refrigeration system serving a retail food store is operated for normal use, the following equipment and systems shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified by the Reference Nonresidential Appendix NA7. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements:~~
~~A. Air-cooled condensers and fluid coolers shall be tested in accordance with NA7.14.1~~
~~B. Evaporative condensers, fluid coolers and cooling towers shall be tested in accordance with NA7.14.2~~
~~C. Compressor floating suction controls shall be tested in accordance with NA7.14.3~~
~~D. Liquid subcooling shall be tested in accordance with NA7.14.4~~
~~E. Display case lighting controls shall be tested in accordance with NA7.14.5~~
~~F. Refrigeration heat recovery shall be tested in accordance with NA7.14.6~~

19. PART 6, SECTION 120.6(d) 4 P. 153 115

Edited for clarity.

4. Newly installed process boilers with an input capacity greater than 10 MMBtu/h (10,000,000 Btu/h) shall maintain excess (stack-gas) oxygen concentrations at less than or equal to 3.0 ~~%~~ 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~~ measured flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited.

20. PART 6, SECTION 120.6(e), P. 153 116

Punctuation error fixed.

EXCEPTION to Section 120.6(e):

1. Trim Compressor and Storage. (a period was removed) A or B

21. PART 6, SECTION 120.9(C), P. 158 121

Edited for clarity and consistency.

(c) Newly installed boilers with input capacity 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 ~~the entire~~ firing ~~range~~rates of 20 percent to 100 percent. 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.

22. PART 6, SECTION 130.1(a)2, P. 164 125

Edited to simplify phrasing and eliminate a redundancy.

EXCEPTION 2 to Section 130.1(a)2: Public restrooms having two or more stalls may use a ~~captive key override or other~~ manual switch not accessible to unauthorized personnel.

23. PART 6, SECTION 130.1(e), P. 172 130

Capitalization changed. Edited for clarity.

Replace "Demand Responsive Signal" with "Demand Response Signal". "Demand Response Signal" is defined whereas "Demand Responsive Signals" is grammatically incorrect and not defined.

(e) **Demand Responsive Controls.**

Lighting power in buildings larger than 10,000 square feet shall be capable of being automatically reduced in response to a D~~d~~emand R~~r~~esponse~~sive~~ S~~s~~ignal; so that the building's total lighting power can be lowered by a minimum of 15 percent below the ~~maximum~~ total installed lighting power. Lighting shall be reduced in a manner consistent with uniform level of illumination requirements in TABLE 130.1-A.

24. PART 6, SECTION 130.3(a)3, P. 178 134

Edited for clarity and consistency.

1. **Demand Responsive Electronic Message Center Control.** An Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal ~~that is sent out by the local electric utility~~.

25. SECTION 130.5(d), P. 181 137

Added for consistency.

(d) **Circuit Controls for 120-Volt Receptacles**. In all buildings, both controlled and uncontrolled 120 volt receptacles shall be provided in each private office, open office area, reception lobby, conference room, kitchenette in office spaces, and copy room. Additionally, hotel/motel guest rooms shall comply with item 5. Controlled receptacles shall meet the following requirements, as applicable:

26. SECTION 140.3(a)1Aia 2, P. 190 141

Indentation changed on Exception 1 through 4 and wording edited for clarity in Exception 4.

EXCEPTION 4 to SECTION 140.3(a)1Aia: An aged solar reflectance less than 0.63 is allowed provided the maximum roof/ceiling U-factor in TABLE 140.3 is ~~met~~not exceeded.

27. PART 6 SECTION 140.3(A)1B, P. 192 142

Edited for clarity.

B. **Roof Insulation.** Roofs shall ~~C.~~ h~~H~~ave an overall assembly U-factor no greater than the applicable value in TABLE 140.3-B, C ~~and~~or D~~, or~~ , and ~~shall be,~~ -where required by Section 110.8(e), insulation shall be placed in direct contact with a continuous roof or drywall ceiling ~~where required by Section 110.8(e).~~.

28. PART 6 SECTION 140.3(A)5B, P. 192 142

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

~~(I)~~ i the lower-rated 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 daylight levels or solar intensity~~. to demonstrate compliance with this section;~~

~~(II)~~ ii. C~~c~~hromogenic glazing shall be considered separately from other fenestration; and

~~(III)~~ 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 U-factor into the space in multiple steps in response to daylight levels or solar intensity.~~

29. PART 6 SECTION 140.3(A)5C, P. 193 143

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

(I) i the lower-rated 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 daylight levels or solar intensity. to demonstrate compliance with this section; and

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

(III) 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.~~

30. PART 6 SECTION 140.3(A)5D, P. 193 143

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

(I) i the higher-rated 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 daylight levels or solar intensity; and ~~to demonstrate compliance with this section;~~

(II) ii. Cchromogenic glazing shall be considered separately from other fenestration; and

(III) 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 demonstrateassess 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.~~

31. PART 6 SECTION 140.3(a)6B, P. 194 144

Non-substantive changes to improve the clarity of the Standards. No new requirements have been added to this section; reorganizing by numbering each requirement instead of keeping all together in a paragraph and moving language regarding automatic controls to modulate U-factor heat flow; clarify to ensure that automatic controls need to be used to receive the more efficient values.

EXCEPTION to Section 140.3(a)6B: For skylights containing chromogenic type glazing:

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

(II) ii. ~~C~~chromogenic glazing shall be considered separately from other skylights; and

(III) iii. area-weighted averaging with other skylights that are 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.~~

32. PART 6 SECTION 140.3(a)6C, P. 194 147

Non-substantive changes to improve the clarity of the Standards. No new requirements have been added to this section; reorganizing by numbering each requirement instead of keeping all together in a paragraph; clarify to ensure that automatic controls need to be used to receive the more efficient values. Additionally, the reason for replacing "higher" for "lower" corrects a clear typographical error. Higher SHGC levels decrease energy efficiency. The error here is in conflict with the SHGC requirements specified in Tables 140.3-B, C, and D;.

EXCEPTION to Section 140.3(a)6C: For skylights containing chromogenic type glazing:

(I) i. the~~ higher~~-lower-rated labeled SHGC shall be used with automatic controls to modulate the amount of heat flow into the space in multiple steps in response to daylight levels or solar intensity; and ~~to demonstrate compliance with this section~~;

(II) ii. ~~C~~chromogenic glazing shall be considered separately from other skylights; and

(III) iii. area-weighted averaging with other skylights that are not chromogenic shall not be permitted.

33. PART 6 SECTION 140.3(a)6D, P. 194 147

Non-substantive changes to improve the clarity of the Standards. No new requirements have been added to this section; reorganizing by numbering each requirement instead of keeping all together in a paragraph; clarify to ensure that automatic controls need to be used to receive the more efficient values. Additionally, the reason for replacing "lower" for "higher" corrects a clear typographical error. Higher VT levels increase energy efficiency. The error here is in conflict with the VT requirements specified in Tables 140.3-B, C, and D.

EXCEPTION to Section 140.3(a)6D: For skylights containing chromogenic type glazing:

(I) i. the higher~~lower~~ higher-rated labeled VT shall be used with automatic controls to modulate the amount of light transmitted into the space in multiple steps in response to daylight levels or solar intensity; and ~~to demonstrate compliance with this section;~~

(II) ii. ~~C~~chromogenic glazing shall be considered separately from other skylights; and

(III) iii. area-weighted averaging with other skylights that are ~~is~~ not chromogenic shall not be permitted.

34. PART 6, SECTION 140.3, P. 200, 203 and 207. 147 149 151

TABLES 140.3-B, 140.3-C AND 140.3-D,

Edited for clarity. Removing the word “opaque”

~~Opaque~~ Exterior Doors,
Maximum U-factor

35. PART 6 SECTION 140.3, Table 140.3-C, Page 203 149

Typographical error for climate zone 4 and 5 corrected for light mass walls.

Walls	Metal Building	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.057	0.057	0.057	0.057	0.057	0.057
	Metal-framed	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105
	Mass Light[1]	0.170	0.170	0.170	0.170	0.170	0.227	0.227	0.227	0.196	0.170	0.170	0.170	0.170	0.170	0.170	0.170
	Mass Heavy[1]	0.160	0.160	0.160	0.184	0.211	0.690	0.690	0.690	0.690	0.690	0.184	0.253	0.211	0.184	0.184	0.160
	Wood-framed and Other	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.042	0.059	0.059	0.042	0.042	0.042

For the Low-Sloped Roofing products where ever there is a NR for the Aged Solar Reflectance there should be a NR for the Thermal Emittence to be consistent with the language of section 140.3(a)1Aiii.

Low-sloped	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	0.55	0.55	0.55	NR	0.55	0.55	0.55	NR
	Thermal Emittance	NR	~~0.75~~NR	~~0.75~~ NR	~~0.75~~ NR	~~0.75~~ NR	~~0.75~~ NR	~~0.75~~ NR	~~0.75~~ NR	0.75	0.75	0.75	~~0.75~~ NR	0.75	0.75	0.75	NR

36. PART 6, TABLE 140.4-A, P. 215 156

The efficiency values in TABLE 140.4-A ECONOMIZER TRADE-OFF TABLE FOR COMFORT COOLING SYSTEMS were updated to match the national standards specified in ASHRAE 90.1; however, the values for climate zones 4 and 5 were erroneously copied into this table; the corrected values to be inserted in the Table are below:

Climate Zone 4 is listed as ~~70%~~ but should be 65%.
Climate Zone 5 is listed as ~~30%~~ but should be 70%.

37. PART 6, SECTION 140.6(a)2Kii, P. 228 165

Edited for consistency and clarity.

ii. ~~I~~The controlled lighting shall be capable of being automatically reduced ~~by a demand responsive lighting control in accordance with the applicable requirements in Section 130.1(e)1A and B.~~ in response to a demand ~~responsive~~ response signal; and

38. SECTION 141.0(b)2Bia, P. 265 188

Edited for clarity.

EXCEPTION to Section 141.0(b)2Bia: An aged solar reflectance less than 0.63 is allowed provided the maximum roof/ceiling U-factor in TABLE 141.0-B is ~~met~~not exceeded.

39. EXCEPTION TO SECTION 141.0(b)2Biii , P. 266 189

There was never a changed proposed for this language in the stakeholder meetings or the Energy Commission workshops; this is original language from the 2008 Standards and was part of the 45-day language; however, when the 15-day language section was reformatted, the sentence was inadvertently removed.

a. Existing roofs that are insulated with at least R-7 insulation or it has a U-factor lower than 0.089 are not required to meet the R-value requirement of TABLE 141.0-C.

40. PART 6, SECTION 150.0(a)1, P. 282 198

Edited for clarity.

EXCEPTION to Section 150.0(a)1 Insulation of rafter roofs in an ~~addition or~~ alteration shall be insulated between wood-framing members with insulation resulting in an installed thermal resistance of R-19 or greater.

41. PART 6, SECTION 150.0(k)2B, P. 288 201

Numbering corrected. Language changed for clarity.

Switching Devices and Controls.

EXCEPTION to Section 150.0(k)2B:

2. The weighted average U-factor ~~of ceilings~~ shall not exceed ~~the U-factor~~ 0.031 that would result from installing R- ~~19~~ 30 insulation between wood-framing members. ~~in the entire ceiling and rafter roof area and accounting for the effects of framing members.~~

42. PART 6, SECTION 150.0(m)15, P. 295 207

Added missing language "or equal to" for consistency with other instances of this compliance criterion for fan efficacy (see Standards Sections 150.0(m)13B, 150.1(c)10, and Reference Residential Appendix RA3.3.3.4.3 step 2). Added the term "applicable" for

clarification that systems using the exception to 150.0(m)15 are not required to comply in all zonal control modes as described in RA3.3.3.1 and RA3.3.3.4.3. Added to the exception to 150.0(m)15 ", or single speed compressor systems that utilize the performance compliance approach set forth in Section 150.1(b)" in order to correct conflicting language thus enabling the performance trade-off for the 350 cfm/ton in all zonal control modes requirement that was the intent of the HVAC Bypass Ducts prescriptive requirement given in Section 150.1(c)13.

15. **Zonally Controlled Central Forced Air Systems.** Zonally controlled ~~C~~central forced air cooling systems shall be capable of simultaneously delivering~~demonstrate~~, in every zonal control mode, an airflow from the dwelling, through the air handler fan and delivered to the dwelling, of greater than 350 CFM per ton of nominal cooling capacity, and operating at an air-handling unit fan efficacy of less than or equal to 0.58 W/CFM as confirmed by field verification and diagnostic testing in accordance with the applicable procedures specified in Reference Residential Appendix RA3.3.

EXCEPTION to 150.0(m)15: Multi-speed compressor systems or variable speed compressor systems, or single speed compressor systems that utilize the performance compliance approach set forth in Section 150.1(b) shall demonstrate compliance for airflow (cfm/ton) and fan efficacy (Watt/cfm) by operating the system at maximum compressor capacity and maximum system fan speed and with all zones calling for conditioning.

43. PART 6, SECTION 150.0(m)15, P. 295 207

Added missing language for consistency with other instances of this compliance criterion for fan efficacy (see Standards Sections 150.0(m)13B, 150.1(c)10, and Reference Residential Appendix RA3.3.3.4.3 step 2).

…and operating at an air-handling unit fan efficacy of less than or equal to 0.58 W/CFM as confirmed by field verification and diagnostic testing in accordance with the procedures specified in Reference Residential Appendix RA3.3.

44. PART 6, TABLE 150.0-C, TABLE 150.0-D, P. 300-301 201-211

Re-post of two tables correctly displayed in 45-Day Language but obscured in the posted 15-Day document.

TABLE 150.0-~~E~~C: Return Duct Sizing for Single Return Duct Systems

Return duct length shall not exceed 30 feet and shall contain no more than 180 degrees of bend. If the total bending exceeds 90 degrees, one bend shall be a metal elbow.

Return grille devices shall be labeled in accordance with the requirements in section 150.0(m)12A to disclose the grille's design airflow rate and a maximum allowable clean-filter pressure drop of 12.5 Pa (0.05 inches water) for the air filter media as rated in accordance with AHRI Standard 680 for the design airflow rate for the return grille.

System Nominal Cooling Capacity (Ton)*	**Minimum Return Duct Diameter (inch)**	**Minimum Total Return Filter Grille Gross Area ($inch^2$)**
1.5	16	500
2.0	18	600
2.5	20	800

***Not applicable to systems with nominal cooling capacity greater than 2.5 tons or less than 1.5 ton

TABLE 150.0-~~F~~D: Return Duct Sizing for Multiple Return Duct Systems

Each return duct length shall not exceed 30 feet and shall contain no more than 180 degrees of bend. If the total bending exceeds 90 degrees, one bend shall be a metal elbow.

Return grille devices shall be labeled in accordance with the requirements in section 150.0(m)12A to disclose the grille's design airflow rate and a maximum allowable clean-filter pressure drop of 12.5 Pa (0.05 inches water) for the air filter media as rated in accordance with AHRI Standard 680 for the design airflow rate for the return grille.

System Nominal Cooling Capacity (Ton)*	**Return Duct 1 Minimum Diameter (inch)**	**Return Duct 2 Minimum Diameter (inch)**	**Minimum Total Return Filter Grille Gross Area ($inch^2$)**
1.5	12	10	500
2.0	14	12	600
2.5	14	14	800
3.0	16	14	900
3.5	16	16	1000
4 .0	18	18	1200
5 .0	20	20	1500

***Not applicable to systems with nominal cooling capacity greater than 5.0 tons or less than 1.5 tons.

45. PART 6 SECTION 150.1(c)1B, P. 306 213

Edited for consistency and clarity.

B.- Wall~~-~~ (including heated basements and crawl spaces) insulation shall be installed that has ~~which have~~ a U-factor equal to or less than, or R-value equal to or greater than shown

in TABLE 150.1-A shall be installed. The maximum U-factors or minimum opaque wall R-values shown are for insulation installed between wood-framing members. Above grade mass walls and below grade walls shall have insulation installed resulting in a wall assembly U-factor equal to or less than shown in TABLE 150.1-A.

46. P**ART 6 SECTION 150.1(c)1D, P. 306 213**

Edited for clarity.

~~B~~~~C~~D. Slab floor perimeter insulation shall be installed with a U-factor equal to or less than or R-value equal to or greater than shown in TABLE 150.1-A. ~~The maximum U-factors or minimum R-values shown are for insulation installed between wood-framing members.~~ The minimum depth of concrete-slab floor perimeter insulation shall be 16 inches or the depth of the footing of the building, whichever is less. ~~The minimum depth of concrete slab floor perimeter insulation shall be 16 inches or the depth of the footing of the building, whichever is less.~~

47. P**ART 6 SECTION 150.1(c)3A, P. 307 214**

Language changed for clarity.

EXCEPTION 1 to Section ~~151~~150.1(~~f~~c)3A: For each ~~building~~ dwelling unit~~,~~ up to ~~an additional~~ 3 square feet of ~~the~~ new glazing area installed in doors and up to an additional ~~2~~3 square foot of new tubular skylights area with dual-pane diffusers shall not be required to meet the U-factor and SHGC requirements of TABLE 150.1-A.total fenestration area and west-facing fenestration area requirements of Sections 150.1(c)3B and C.

48. P**ART 6 SECTION 150.1(c)3A, P. 307 214**

Language changed for clarity.

EXCEPTION 2 to Section 150.1(c)3A: For each ~~building~~ dwelling unit up, to 161210~~8~~ square feet of new skylight area with a maximum U-factor of 0.55 and a maximum of SHGC of 0.30., shall not be required to meet the total fenestration area and west-facing fenestration area requirements of Sections 150.1(c)3B and C.

49. P**ART 6 SECTION 150.1(c)3A, P. 307 214**

Language placement changed for clarity.

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

i. the lower-rated labeled U-factor and SGHC shall be used with automatic controls to modulate the amount of solar gain and light transmitted into the space in multiple steps in response to daylight levels or solar intensity; and 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 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).~~

50. PART 6 SECTION 150.1, TABLE 150.1-A, footnote 2, page 327 220

Language phrasing and placement changed for clarity.

2. 2. U-factors can be met by cavity insulation alone, ~~and~~/or with continuous insulat~~ed sheating~~ion alone, or with both cavity and continuous insulation that~~,~~ results in a U-factor equal to or less than the U-factor shown. "R-15+4" means R-15 cavity insulation plus R-4 continuous insulat~~ed~~ion~~sheathing.~~ Any combination of cavity insulation and/or continuous insulat~~ed~~ion~~sheathing~~ that results in a U-factor equal to or less than 0.065 is allowed, such as R-13+5. ~~Continuous insulated sionsheating is not required for demising partitions, such as exterior walls adjacent to an unconditioned garage.~~

51. PART 6 SECTION 150.2(b)1A, P. 331 222

Language changed for clarity.

EXCEPTION 2 to Section 150.2(b)1A: Alterations that add up to 16 square feet of new skylight area with a maximum U-factor of 0.55 and a maximum SHGC of 0.30 area shall not be required to meet the total fenestration area and west-facing fenestration area requirements of Sections 150.1(c)3B and C.

52. PART 6 Section 150.2(b)1Hii, Page 335 226

Explanation:

Low-sloped roofs in climate zones 13 and 15 shall have a 3-year aged solar reflectance equal or greater than ~~0.55~~ 63.~~65~~and a thermal emittance equal or greater than 0.75, or a minimum SRI of ~~64~~75

53. PART 6 TABLE 150.2-B, P. 337 227

The language in the exception is redundant and potentially in conflict with the requirements specified in Table 150.2-B. The language related to window films in the corrected version Table 150.2-B negates the need for Exception 4.

~~**EXCEPTION 4 to Section 150.2(b): Window Films.** Applied window films installed as part of an alteration complies with the U-factor and SHGC requirement of TABLE 150.2-B.~~

54. PART 6, APPENDIX 1-A, P. 339 228

Edited dates of references.

AHRI~~ARI~~ 550/590-~~98~~ ~~2003~~ 2011 Performance Rating of ~~Standard for~~ Water-Chilling Packages Using the Vapor Compression Cycle (~~2003~~~~1998~~ 2011)

55. PART 6, JOINT APPENDIX, JA1, P. JA1-14 11

Definition edited for clarification and consistency to match definition in SECTION 100.1

CYCLES OF CONCENTRATION is the number of times the concentration of total dissolved solids (TDS) in cooling tower water is multiplied relative to the TDS in the makeup water. ~~Cycles of concentration is a measurement of the concentration of total dissolved solids (TDS) in cooling tower water.~~ Because evaporation of pure water leaves dissolved solids behind in the system water, TDS increases over time as the tower operates. The number of times the dissolved minerals are concentrated is relative to the TDS in the makeup water. For example, 5 cycles of concentration represents five times the concentration of solids in the cooling tower system water relative to the TDS in the makeup water entering the tower.

56. PART 6, JOINT APPENDIX, JA1, P. JA1-23 18

Delete the definition of U-FACTOR, FENESTRATION for clarification since the same definition is located under two different names

~~**U-FACTOR, FENESTRATION** is the overall coefficient of thermal transmittance of a construction assembly, inBtu/(hr x ft² x °F), including air film resistance at both surfaces.~~

57. PART 6, JOINT APPENDIX, JA1, P. JA1-27 20

Definition removed from this section.

~~**GLAZED DOOR** See DOOR, Door~~

58. PART 6, JOINT APPENDIX, JA-1 P. JA1-65 44

Definition edited for clarity. This is done to be consistent with the chapter 2 Definition 2012 International Energy Conservation Code.

U-FACTOR, ~~**ENVELOPE**~~ is the overall coefficient of thermal transmittance of a fenestration, wall, floor ~~or~~ roof~~/~~ or, ceiling ~~construction assembly~~ component, in Btu/(hr x ft² x °F), including air film resistance at both surfaces.

59. PART 6, JOINT APPENDIX, JA1, P. JA1-66 45

Definition edited for clarification and consistency to match definition in SECTION 100.1

WATER BALANCE IN EVAPORATIVE COOLING TOWERS The water balance of a ~~in~~ cooling tower~~s~~ is:

60. PART 6, JOINT APPENDIX, JA4, TABLE 4.3.3 P. JA4-44 37

Edited for clarity.

This table contains U-factors for steel or metal-framed walls, which are typical of nonresidential buildings. The table may be used for any construction assembly where the ~~primary~~ insulation is installed in the cavity of a metal-framed wall, or where continuous insulation is installed on the exterior or interior of the metal framing, or a combination of these two methods of insulating a metal-framed wall.~~e.g. uninsulated curtain walls with metal furring on the inside.~~

61. PART 6, JOINT APPENDIX, JA-4 TABLE 4.5.1 P. JA4-82 72

Remove the word opaque from the title of the table.

Table 4.5.1 – ~~Opaque~~ Doors

62. Part 6, Joint Appendix, JA5.1, p. JA5-15 2

Updated the URL for NEMA Standards Publication DC 3-2008 – "Residential Controls – Electrical Wall-Mounted Thermostats"

[6] NEMA DC 3-2008 - ~~http://www.nema.org/stds/dc3.cfm~~http://www.nema.org/Standards/Pages/Residential-Controls-Electrical-Wall-Mounted-Room-Thermostats.aspx

63. PART 6, JOINT APPENDIX, JA9, P. JA9-1 XX

The wrong accreditation laboratory was cited in the adopted language. The proposed change will reference the correct accreditation laboratory (which is closely related to the cited laboratory) without changing the Standards requirements. Both organizations, ILAC and IAF work together and coordinate their efforts to enhance the accreditation and the conformity assessment worldwide.

JA9.2.2 Testing Laboratory Requirements
The Air-Handling Unit shall be tested in a laboratory that has demonstrated compliance with ISO Standard 17025, General Criteria for the Competence of Testing and Calibration Laboratories, and is accredited for the ASHRAE Standard 193 test methods. The accreditation body shall be a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement www.ilac.org. ~~The accrediting body shall be a signatory to the International Accreditation Forum Multilateral Recognition Agreement (IAF MLA). http://www.iaf.nu/~~

64. PART 6, NONRESIDENTIAL APPENDIX, NA7.5.15.2, P. 7-24 20

Description of change: Grammar correction.

NA7.5.15.2 Functional Testing
• Check to make sure that chilled and hot water coils, if used, are not already fully open and calling for maximum cooling/heating. If this is the case, reverse Steps 1 and 2 ~~A~~and/or change the setpoint range as necessary to conduct this test.

65. PART 6, NONRESIDENTIAL APPENDIX, NA7.5.16.2, P. 7-25 21

A preliminary activity before Step 1 in this functional test has been added for clarity. It is appropriate for the reset control parameter to be identified before it can be adjusted in Step 1.

NA7.5.16.2 Functional Testing

● The system cooling load must be sufficiently high to run the test. If necessary, artificially increase the evaporator load to perform the functional tests, or wait until a time of stable chiller operation. If necessary, reverse Steps 1 and 2 in the test based on atmospheric conditions and buildings loads.

● If testing in cold ambient conditions, ensure that freeze protection controls are installed and functional to prevent equipment damage.

● If the actual control sequence differs significantly from that implied by the tests and/or has already been tested during the building commissioning process, attach a description of the control sequence, a description of the tests that were done to verify the system operates according to the sequence, the test results, and a plot of associated trend data.

● Identify the reset control parameter.

66. PART 6, NONRESIDENTIAL APPENDIX, NA7.5.16.2, P. 7-26 22

Description of change: Step 2 in this functional test involves modulating the controls to meet a higher temperature setpoint. A correction has been added to the language to clarify the instructions for the fans and other equipment must modulate to meet this higher setpoint.

Step 2: Adjust the reset control parameter to increase the condenser water supply temperature toward the upper supply temperature limit. Verify and document the following:

• Condenser water supply temperature controls modulate as intended.

• Actual condenser water supply temperature increases to meet the new setpoint within ±2ºF.

• Cooling tower fan(s) stage properly and/or adjust speed accordingly to meet the ~~lower~~higher setpoint.

• Chiller load amperage increase.

67. PART 6, JOINT APPENDIX, NA7.6, P. NA7-26 TO NA7-33 NA7-23 NA7-31

Missing numbering added.

P. NA7-28	*NA7.6.1.2.1*	***Continuous Dimming Control Systems***
P. NA7-29	NA7.6.1.2.2 ***Control Systems***	***Stepped Switching or Stepped Dimming***

Numbering corrected.

P. NA7-26	~~*NA7.6.2.1*~~	*NA7.6.1.1*	***Construction Inspection***
P. NA7-28	~~NA7.6.2.2~~	NA7.6.1.2	***Functional testing***

P. NA7-32	~~NA7.6.6~~	NA7.6.2	***Acceptance tests for Shut-off Controls complying with section 130.1(c)***
P. NA7-32	~~NA7.6.6.1~~	NA7.6.2.1	***Construction Inspections and Acceptance Tests***
P. NA7-32	~~NA7.6.6.2~~	NA7.6.2.2	***Occupancy Sensing Lighting control Construction Inspection***
P. NA7-32	~~NA7.6.6.3~~	NA7.6.2.3	***Occupancy Sensing Lighting Control Functional Testing***
P. NA7-33	~~NA7.6.6.4~~	NA7.6.2.4	***Automatic Time Switch Lighting Control Construction Inspection***
P. NA7-33	~~NA7.6.6.5~~	NA7.6.2.5	***Automatic Time Switch Lighting Control Functional testing***
P. NA7-33	~~NA7.6.7~~	NA7.6.3	***Acceptance tests for Demand Responsive Controls in accordance with Section 130.1(e).***
P. NA7-33	~~NA7.6.7.1~~	NA7.6.3.1	***Construction Inspection***
P. NA7-33	~~NA7.6.7.2~~	NA7.6.3.2	***Functional testing of Demand Responsive Lighting Controls***
P. NA7-39	~~NA7.8.1.3~~	NA7.8.1.2.1	***Construction Inspection***
P. NA7-39	~~NA7.8.1.4~~	NA7.8.1.2.2	***Functional testing***

68. PART 6, JOINT APPENDIX, NA7.6, P. NA7-39 NA7-31

Re-inserted word that was incorrectly deleted in NA7.8.1.4.

Step 2: Stimulate no motion in area with lighting controlled by the sensor. ~~sensor but with motion adjacent to this area.~~

69. PART 6, RESIDENTIAL APPENDIX, TABLE RA2-1, P. RA2-3 3

Edited for consistency with the 15-day language that changed the requirement from a prohibition in 150.0(m)14 to prescriptive requirement in 150.1(c)13 and revised RA3.1.4.6 accordingly.

Verification of Prescriptive Bypass Duct ~~Prohibition~~ Requirements	Verification to confirm zonally controlled systems comply with the bypass duct requirements in ~~determine if system is zonally controlled, and confirm that bypass ducts are not used as required by Section 150.0(m)14~~ 150.1(c)13.	RA3.1.4.6

70. PART 6 RA2-4 4

Language corrected to reflect changes made in 15 day language in reference table.

Verified Point of Use (POU-H)	Inspection that all hot water fixtures in the dwelling unit, with the exception of the clothes washer, must be located within ~~8 feet~~ a restricted length (total piping length) based on pipe diameter from a water heater. To meet this requirement, most houses will require multiple water heaters	RA3.6.6

71. PART 6, RESIDENTIAL APPENDIX, TABLE RA3.1-1, P. RA3-3 3

Edited for consistency with the 15-day language that changed the requirement from a prohibition in 150.0(m)14 to prescriptive requirement in 150.1(c)13 and revised RA3.1.4.6 accordingly.

Verification of Prescriptive Bypass Duct ~~Prohibition~~ Requirements	Verification to confirm zonally controlled systems comply with the bypass duct requirements in ~~Verify compliance with the bypass prohibition in150.0(m)14~~ 150.1(c)13.	RA3.1.4.6

72. PART 6, RESIDENTIAL APPENDIX, RA3.1.4.6, P. RA3-13 11

Corrected spelling of "zonally" in title. Added language: "system with the" to clarify that the performance of the system that is affected by the addition of bypass ducts must conform to requirements on the Certificate of Compliance which may include confirmation of minimum airflow rate (cfm/ton) compliance criteria.

RA3.1.4.6 Verification of Prescriptive Bypass Duct Requirements for Zonally Controlled Forced Air Systems ~~Verification of Bypass Duct Prohibition~~

~~Verification shall consist of a visual inspection to confirm if the system is zonally controlled, and confirm that the duct design conforms to the criteria given in Standards Section 150.0(m)14.~~ When a zonally

controlled forced-air system is installed, the following shall be verified to determine compliance as required by Standards Section 150.1(c)13:

1. A visual inspection shall confirm that bypass ducts that deliver conditioned supply air directly to the space conditioning system return duct airflow are not used; or
2. If the Certificate of Compliance indicates an allowance for use of a bypass duct, the system with the bypass duct shall conform to the specifications given on the Certificate of Compliance.

If the zonally controlled system meets one of these criteria, the system complies. Otherwise the system does not comply

73. PART 6, RESIDENTIAL APPENDIX, TABLE RA3.1-1, P. RA3-55 42

Edited to (1) clarify requirements apply in cold climates, and that climate zones provide examples of where likely to be applicable; (2) reduce insulation requirement; and (3) clarify language on how to address situations when insufficient space for insulation. These edits do not change the requirements of the language.

(c) In cold climates, where water pipes may freeze (such as Climate Zones 2, 11-14 and 16) pipes shall have at least ~~2/3~~ 1/2 of the insulation between the water pipe and towards the outside surface of the exterior wall. If the pipe is ~~near~~ closer to the exterior finish assembly layers, as much insulation as possible shall be placed between the pipe and the outside (without excessive compression), and remaining ~~no~~ insulation shall be placed between the pipe and the interior assembly material.

74. PART 6, RESIDENTIAL APPENDIX, TABLE RA3.1-1, P. RA3-61 48

Edited to (1) clarify requirements apply in cold climates, and that climate zones provide examples of where likely to be applicable; (2) reduce insulation requirement; and (3) clarify language on how to address situations when insufficient space for insulation. These edits do not change the requirements of the language.

(d) In cold climates, where water pipes may freeze (such as Climate Zones 2, 11-14 and 16) pipes shall have at least ~~2/3~~ 1/2 of the insulation between the water pipe and towards the outside surface of the exterior wall. If the pipe is ~~near~~ closer to the exterior finish assembly layers, as much insulation as possible shall be placed between the pipe and the outside (without excessive compression), and remaining ~~no~~ insulation shall be placed between the pipe and the interior assembly material.

75. PART 6, RESIDENTIAL APPENDIX, RA3. 8.10, P. RA3-114 89

Corrected to match RESNET Standard 4; this corrected a typographical error.

Specific Leakage Area may be calculated by: *SLA* = ~~69.4~~0.00694 x ELA/ building floor area (square feet)

76. PART 6, RESIDENTIAL APPENDIX, RA4.4.5, P. RA4-10 8

Move language to RA4.4.16 HERS-Verified Compact Hot Water Distribution System (CHWDS-H). Corrected to reflect Compact Distribution as a HERS measure only

RA4.4.5 ~~Compact Hot Water Distribution System (CHWDS-H)~~Reserved for future use

~~A HERS inspection is required in order to obtain this credit. To meet the Compact HWDS requirement, the longest measured pipe run length between a hot water use point and the water heater serving that use shall be no more than the distance specified in Table 4.4.5. This table specifies the maximum pipe length as a function of Floor Area Served, where Floor Area Served is defined as the conditioned floor area divided by the number of installed water heaters.~~

~~TABLE 4.4.5~~

~~Floor Area Served (ft2)~~	~~Maximum Measured Water Heater To Use Point Distance (ft)~~
~~< 1000~~	~~28'~~
~~1001 – 1600~~	~~43'~~
~~1601 – 2200~~	~~53'~~
~~2201 – 2800~~	~~62'~~
~~>2800~~	~~68'~~

~~Requirements include that:~~

~~(a) The floor area (ft2) of the building matches the conditioned floor area that was used in compliance documentation. (Note: Floor Areas Served equals the conditioned floor area divided by the number of installed water heaters)~~

~~(b) The length from the water heater to the furthest use point it serves shall be equal to or less than listed in Table 4.4.5. Measurements shall be made to the nearest half foot.~~

~~(c) The hot water distribution system piping from the water heater(s) to the fixtures and appliances must take the most direct path. For example, in a house with more than 1-story and the water heater in the garage, this requirement would exclude running hot water supply piping from the manifold to the attic, and then running the line back down to a first floor point of use.~~

~~(d) Hot water piping shall be insulated to a level that meets the requirements of §150.0(j) and be installed in accordance with Proper Installation of Pipe Insulation R4.4.1.~~

77. PART 6, RESIDENTIAL APPENDIX, RA4.4.6, P. RA4-10 8

Move language to RA4.4.17 HERS-Verified Point of Use. Corrected to reflect Point of Use as a HERS measure only

RA4.4.6 ~~Point-of-Use (POU)~~ Reserved for future use

~~A HERS inspection is required in order to obtain this credit. This measure requires that all hot water fixtures in the dwelling unit, with the exception of a stand-alone tub must use no more pipe per run than defined in Table 4.4.6. To meet this requirement most houses will require multiple water heaters.~~

~~Table 4.4.6~~

~~Size Nominal, Inch~~	~~Length of Pipe (feet)~~
~~3/8"~~	~~15~~
~~1/2"~~	~~10~~
~~3/4"~~	~~5~~

~~(a) Measurements shall be made to the nearest half foot.~~

~~(b) If a combination of piping is used in a single run then one half the allowed length of each size is the maximum installed length.~~

~~(c) The hot water distribution system piping from the water heater(s) to the fixtures and appliances must take the most direct path. For example, in a house with more than 1 story and the water heater in the garage, this requirement would exclude running hot water supply piping from the manifold to the attic, and then running the line back down to a first floor point of use.~~

~~(d) Hot water piping shall be insulated to a level that meets the requirements of §150.0(j) and be installed in accordance with Proper Installation of Pipe Insulation R4.4.1.~~

78. PART 6, RESIDENTIAL APPENDIX, RA4.4.16, P. RA4-14 11

Language moved from RA4.4.5. Corrected to reflect Compact Distribution as a HERS measure only

A HERS inspection is required in order to obtain this credit. To meet the Compact HWDS requirement, the longest measured pipe run length between a hot water use point and the water heater serving that use

shall be no more than the distance specified in Table 4.4.5. This table specifies the maximum pipe length as a function of Floor Area Served, where Floor Area Served is defined as the conditioned floor area divided by the number of installed water heaters.

TABLE 4.4.5

Floor Area Served (ft2)	Maximum Measured Water Heater To Use Point Distance (ft)
< 1000	28’
1001 – 1600	43’
1601 – 2200	53’
2201 – 2800	62’
>2800	68’

Requirements include that:

(a) The floor area (ft2) of the building matches the conditioned floor area that was used in compliance documentation. (Note: Floor Areas Served equals the conditioned floor area divided by the number of installed water heaters)

(b) The length from the water heater to the furthest use point it serves shall be equal to or less than listed in Table 4.4.5. Measurements shall be made to the nearest half foot.

(c) The hot water distribution system piping from the water heater(s) to the fixtures and appliances must take the most direct path. For example, in a house with more than 1-story and the water heater in the garage, this requirement would exclude running hot water supply piping from the manifold to the attic, and then running the line back down to a first floor point of use.

(d) Hot water piping shall be insulated to a level that meets the requirements of §150.0(j) and be installed in accordance with Proper Installation of Pipe Insulation R4.4.1.

~~Consistent with the requirements of RA4.4.5 this measure requires a HERS inspection to verify length and pipe insulation.~~

79. PART 6, RESIDENTIAL APPENDIX, RA4.4.17, P. RA4-14 12

Language moved from RA4.4.6. Corrected to reflect Point of Use as a HERS measure only

A HERS inspection is required in order to obtain this credit. This measure requires that all hot water fixtures in the dwelling unit, with the exception of a stand-alone tub must use no more pipe per run than defined in Table 4.4.6. To meet this requirement most houses will require multiple water heaters.

Table 4.4.17

Size Nominal, Inch	Length of Pipe (feet)
3/8”	15
1/2”	10
3/4”	5

(a) Measurements shall be made to the nearest half foot.

(b) If a combination of piping is used in a single run then one half the allowed length of each size is the maximum installed length.

(c) The hot water distribution system piping from the water heater(s) to the fixtures and appliances must take the most direct path. For example, in a house with more than 1-story and the water heater in the garage, this requirement would exclude running hot water supply piping from the manifold to the attic, and then running the line back down to a first floor point of use.

(d) Hot water piping shall be insulated to a level that meets the requirements of §150.0(j) and be installed in accordance with Proper Installation of Pipe Insulation R4.4.1.

~~Consistent with the requirements of RA4.4.6 this measure requires a HERS inspection to verify length and pipe insulation.~~

80. RA4.5.1 Controlled Ventilation Crawlspace (CVC), Page RA4-16 14

Nonsubstantial change to include provisions of Part 6, Section 150.0(g)3.

Vapor Retarder: A Class I or Class II vapor retarder shall be placed over the earth floor of the crawl space to reduce moisture entry and protect insulation from condensation, as specified in the exception to Section 150.0(d).