

## Prescriptive Additions without HERS Measures – Envelope Only

Additions ≤ 400 ft <sup>2</sup>			
Component	Climate Zone Info		Comments
Roof/Ceiling Insulation	R-22 Min. (0.043 U-factor)		\$150.0
Radiant Barrier	Package A (CZ 2-15) for vented attics		Table 150.1-A
CRRC Rated Cool Roof	<u>Aged Solar Reflectance:</u>	<u>Thermal Emittance:</u>	Table 150.1-A
Low-sloped*	<b>CZ 13 and 15:</b> (0.63)	<b>CZ 13 and 15:</b> (0.75)	<b>*Additions ≤ 300 ft<sup>2</sup> are exempt</b>
Steep-sloped*	<b>CZ 10-15:</b> (0.20)	<b>CZ 10-15:</b> (0.75)	
Walls			
Exterior Walls	<b>CZ 6-7:</b> (0.065 U-factor); <b>CZ 1-5 &amp; 8-16:</b> (0.051)		Table 150.1-A
Demising Walls <sup>1</sup>	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		\$150.0
Extended Walls	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		\$150.2(a)1Bii
Floor Insulation	<b>All CZ – raised wood:</b> 0.037 U-factor (R-19) <b>CZ 1-2, 11, 13-14,16 – raised concrete:</b> 0.092 U-factor (R-8) <b>CZ 3-10 – raised concrete:</b> 0.269 U-factor (R-0) <b>CZ 12, 15 – raised concrete:</b> 0.138 U-factor (R-4)		Table 150.1-A
Slab Edge Insulation			
Un-heated Slabs	<b>CZ 1-15:</b> Not Required <b>CZ16:</b> Min. R-7		Table 150.1-A
Heated Slabs	<b>CZ 1-15:</b> Min. R-5 <b>CZ 16:</b> Min. R-10		\$110.8(g) Table 110.8-A
Fenestration	<b>All CZ:</b> 0.32 U-factor	<b>CZ 2, 4, 6-16:</b> 0.25 SHGC	Table 150.1-A
Glazing Area	<u>West:</u> <b>CZ 2, 4, 6-16:</b> 60 ft <sup>2</sup>	<u>Total:</u> <b>CZ 2, 4, 6-16:</b> 30% or 75 ft <sup>2</sup> (whichever is greater)	\$150.2(a)1B \$150.0(q) \$150.1(c)3

Additions > 400 ft <sup>2</sup> and ≤ 700 ft <sup>2</sup>			
Component	Climate Zone Info		Comments
Roof/Ceiling Insulation	R-22 Min. (0.043 U-factor)		\$150.0
Radiant Barrier	Package A (CZ 2-15) for vented attics		Table 150.1-A
CRRC Rated Cool Roof	<u>Aged Solar Reflectance:</u>	<u>Thermal Emittance:</u>	Table 150.1-A
Low-sloped	<b>CZ 13 and 15:</b> (0.63)	<b>CZ 13 and 15:</b> (0.75)	
Steep-sloped	<b>CZ 10-15:</b> (0.20)	<b>CZ 10-15:</b> (0.75)	
Walls			
Exterior Walls	<b>CZ 6-7:</b> (0.065 U-factor); <b>CZ 1-5 &amp; 8-16:</b> (0.051)		Table 150.1-A
Demising Walls <sup>1</sup>	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		\$150.0
Extended Walls	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		\$150.2(a)1Bii
Floor Insulation	<b>All CZ – raised wood:</b> 0.037 U-factor (R-19) <b>CZ 1-2, 11, 13-14,16 – raised concrete:</b> 0.092 U-factor (R-8) <b>CZ 3-10 – raised concrete:</b> 0.269 U-factor (R-0) <b>CZ 12, 15 – raised concrete:</b> 0.138 U-factor (R-4)		Table 150.1-A
Slab Edge Insulation			
Un-heated Slabs	<b>CZ 1-15:</b> Not Required <b>CZ16:</b> Min. R-7		Table 150.1-A
Heated Slabs	<b>CZ 1-15:</b> Min. R-5 <b>CZ 16:</b> Min. R-10		\$110.8(g) Table 110.8-A
Fenestration	<b>All CZ:</b> 0.32 U-factor	<b>CZ 2, 4, 6-16:</b> 0.25 SHGC	Table 150.1-A
Glazing Area	<u>West:</u> <b>CZ 2, 4, 6-16:</b> 60 ft <sup>2</sup>	<u>Total:</u> <b>CZ 2, 4, 6-16:</b> 25% or 120 ft <sup>2</sup> (whichever is greater)	\$150.2(a)1B \$150.0(q) \$150.1(c)3

<sup>1</sup> *Demising wall:* A wall or partition that separates conditioned space from enclosed unconditioned space.

Note: Also labeled as "interior walls" on the CF1R, and together with exterior walls, makes up part of the "building envelope."

## Prescriptive Additions without HERS Measures – Envelope Only

Additions > 700 ft <sup>2</sup> and ≤ 1,000 ft <sup>2</sup>			
Component	Climate Zone Info		Comments
Roof/Ceiling Insulation	Package A: Options A, B, or C (Table 150.1-A) <i>More detail on Options A, B, and C in green table below</i>		Table 150.1-A
Radiant Barrier	<b>Option A:</b> Required in <b>CZ 2-15</b> <b>Option B:</b> Required in <b>CZ 2-3, 5-7</b> <b>Option C:</b> Required in <b>CZ 2-15</b>		Table 150.1-A
CRRC Rated Cool Roof	<u>Aged Solar Reflectance:</u>	<u>Thermal Emittance:</u>	Table 150.1-A
Low-sloped	<b>CZ 13 and 15:</b> (0.63)	<b>CZ 13 and 15:</b> (0.75)	
Steep-sloped	<b>CZ 10-15:</b> (0.20)	<b>CZ 10-15:</b> (0.75)	
Walls			
Exterior Walls	<b>CZ 6-7:</b> (0.065 U-factor); <b>CZ 1-5 &amp; 8-16:</b> (0.051)		Table 150.1-A
Demising Walls <sup>2</sup>	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		§150.0
Extended Walls	<b>All CZ:</b> R-15 (2 x 4) or R-19 (2 x 6)		§150.2(a)1Bii
Floor Insulation	<b>All CZ – raised wood:</b> 0.037 U-factor (R-19) <b>CZ 1-2, 11, 13-14, 16 – raised concrete:</b> 0.092 U-factor (R-8) <b>CZ 3-10 – raised concrete:</b> 0.269 U-factor (R-0) <b>CZ 12, 15 – raised concrete:</b> 0.138 U-factor (R-4)		Table 150.1-A
Slab Edge Insulation			
Un-heated Slabs	<b>CZ 1-15:</b> Not Required <b>CZ16:</b> Min. R-7		Table 150.1-A
Heated Slabs	<b>CZ 1-15:</b> Min. R-5 <b>CZ 16:</b> Min. R-10		§110.8(g) Table 110.8-A
Fenestration	<b>All CZ:</b> 0.32 U-factor	<b>CZ 2, 4, 6-16:</b> 0.25 SHGC	Table 150.1-A
Glazing Area	<u>West:</u> <b>All CZ:</b> 70 ft <sup>2</sup> , or 5% of CFA in <b>CZ 2, 4, 6-16</b> (whichever is greater)	<u>Total:</u> <b>All CZ:</b> 20% or 175 ft <sup>2</sup> (whichever is greater)	§150.2(a)1B §150.0(q) §150.1(c)3

**Note:** The U-factors/R-values shown for ceiling, wall and raised floor insulation are for wood-frame construction with insulation installed between the framing members, with continuous insulation where appropriate. For alternative construction assemblies, see Section 150.1(c)1A, B, and C, or refer to the Joint Appendices, Chapter 4 (JA4).

### Roof/Ceiling Insulation Options (Additions over 700 ft<sup>2</sup>)

	Option A (CZ 4, 8-16)	Option B (CZ 4, 8-16)	Option C (CZ 4, 8-16)
<b>Roof Deck Insulation<sup>1,2</sup></b>	<b>Above deck continuous insulation:</b> R6 (with air space), R8 (no air space)	<b>Below deck insulation:</b> R13 (with air space), R18 (no air space)	<b>None required</b> (NOTE: This attic requires ducts in conditioned space)
<b>Ceiling Insulation</b>	R38	R38	CZ 4, 8-10: R30 CZ 11-16: R38
<b>Duct Location</b>	Attic allowed	Attic allowed	Conditioned Space
1. Roof deck insulation should be installed flush with the roof deck. Above deck insulation is applied as continuous insulation. Below deck insulation is installed in the cavities between trusses. 2. A designed air space may exist between the roof deck and the finishing roofing material, triggering lower required insulation values.			

<sup>2</sup> *Demising wall:* A wall or partition that separates conditioned space from enclosed unconditioned space.

Note: Also labeled as "interior walls" on the CF1R, and together with exterior walls, makes up part of the "building envelope."

# Prescriptive Additions without HERS Measures – Quick Reference

Table 4.3.1 – U-factors of Wood Framed Walls



Spacing	Cavity Insulation	Nominal Framing Size	Rated R-value of Continuous Insulation <sup>2</sup>											
			R-0	R-2	R-4	R-5	R-6	R-7	R-8	R-10	R-12	R-15		
			A	B	C	D	E	F	G	H	I	J		
16 in. OC	None	Any	0.356	0.209	0.146	0.127	0.113	0.101	0.092	0.078	0.067	0.056		
	R-11	2x4	0.110	0.088	0.074	0.068	0.064	0.060	0.056	0.050	0.045	0.040		
	R-13	2x4	0.102	0.082	0.069	0.064	0.060	0.056	0.053	0.047	0.043	0.038		
	R-15 <sup>1</sup>	2x4	0.095	0.077	0.065	0.060	0.056	0.053	0.050	0.045	0.041	0.036		
	R-19	2x6	0.074	0.063	0.055	0.051	0.049	0.046	0.044	0.040	0.037	0.033		
	R-21 <sup>1</sup>	2x6	0.069	0.059	0.051	0.048	0.046	0.043	0.041	0.038	0.035	0.031		
	R-22	2x6	0.072	0.062	0.054	0.051	0.048	0.045	0.043	0.037	0.036	0.033		
	R-23	2x6	0.067	0.057	0.049	0.047	0.044	0.042	0.040	0.037	0.034	0.030		
	R-25	2x6	0.065	0.055	0.048	0.045	0.043	0.040	0.039	0.035	0.036	0.032		
	R-19	2x8	0.065	0.057	0.051	0.048	0.045	0.043	0.041	0.038	0.035	0.032		
	R-22	2x8	0.061	0.053	0.047	0.045	0.043	0.041	0.039	0.036	0.033	0.030		
	R-25	2x8	0.057	0.050	0.044	0.042	0.040	0.038	0.037	0.034	0.032	0.029		
	24 in. OC	R-30 <sup>1</sup>	2x8	0.056	0.049	0.044	0.041	0.040	0.038	0.036	0.033	0.031	0.028	
None		Any	0.362	0.211	0.148	0.128	0.114	0.102	0.092	0.078	0.067	0.056		
R-11		2x4	0.106	0.086	0.072	0.067	0.062	0.059	0.055	0.050	0.045	0.039		
R-13		2x4	0.098	0.079	0.067	0.062	0.058	0.055	0.052	0.047	0.043	0.038		
R-15		2x4	0.091	0.074	0.063	0.059	0.055	0.052	0.049	0.044	0.040	0.036		
R-19		2x6	0.071	0.061	0.053	0.050	0.048	0.045	0.043	0.040	0.036	0.033		
R-21 <sup>1</sup>		2x6	0.066	0.057	0.050	0.047	0.045	0.042	0.040	0.037	0.034	0.031		
R-22		2x6	0.069	0.060	0.052	0.049	0.047	0.044	0.042	0.036	0.036	0.033		
R-23		2x6	0.064	0.054	0.048	0.045	0.043	0.041	0.039	0.036	0.033	0.030		
R-25		2x6	0.061	0.052	0.046	0.043	0.041	0.039	0.037	0.034	0.035	0.031		
R-19		2x8	0.063	0.055	0.049	0.047	0.045	0.043	0.041	0.037	0.035	0.031		
R-22		2x8	0.058	0.051	0.046	0.044	0.042	0.040	0.038	0.035	0.033	0.030		
R-25		2x8	0.055	0.048	0.043	0.041	0.039	0.037	0.036	0.033	0.031	0.028		
R-30 <sup>1</sup>		2x8	0.054	0.047	0.042	0.040	0.038	0.037	0.035	0.033	0.030	0.028		

**Notes**

- Higher density fiberglass batt is required in these cases.
- Continuous insulation may be installed on either the inside or the exterior of the wall, or both.

# Prescriptive Alterations – Envelope Only

## 2016 Residential Alterations §150.2

		 Mandatory	 Prescriptive		Exception(s) and/or Notes	
Component						
<b>Roof/Ceiling</b>	<b>Insulation:</b> New roof	<u>U-factor = 0.043</u> Vented attic: R-22 at ceiling Unvented attic: R-22 at ceiling or at roof	None		<b>Note:</b> CZ 14 and 16 Class I or II vapor retarder on conditioned space side with air-permeable insulation for both vented and unvented attics	
	Altered roof	U-factor = 0.054				
	Bay window	R-19 with wood framing Package A wall insulation				
<b>Roof/Ceiling</b>	<b>Cool Roof:</b> Alterations: >50% of roof  Addition: ≥300 ft <sup>2</sup>	None	<b>Steep Sloped CZ 10-15</b> Aged Solar Reflectance = 0.20 Thermal Emittance = 0.75 SRI = 16  <b>Low Sloped CZ 13 &amp; 15</b> Aged Solar Reflectance = 0.63 Thermal Emittance = 0.75 SRI = 75		<b>Exceptions: Steep Sloped (any one of the following)</b> 1" air space; Profile ratio of rise to width 1:5 for > 50% width of roof; Ducts HERS tested (existing at 15%) and insulated per Pkg A; R-38 roof insulation; Radiant Barrier; No ducts in the attic; CZ 10-15 >R-2 above roof deck  <b>Exceptions: Low Sloped (any one of the following):</b> No ducts in the attic; Aged Solar Reflectance Insulation Trade Off Table 150.2-B	
	<b>Radiant Barrier:</b> Vented Attic	None	CZ 2-15		<b>Exception:</b> Unvented roof; when installing below roof deck insulation	
<b>Walls</b>	<b>Insulation:</b> Framed	2 x 4: U-factor = 0.102 (R-13) 2 x 6: U-factor = 0.074 (R-19)	None		<b>Exception:</b> Already insulated with R-11 (must use performance approach to show compliance) <b>Note:</b> CZ 14 and 16 Class I or II vapor retarder on conditioned space side with air-permeable insulation	
	Non framed	U-factor = 0.102				
<b>Floor</b>	<b>Insulation:</b> Raised Bay window	U-factor = 0.037 (R-19) Package A wall insulation	None		<b>Exception:</b> Controlled ventilated or unvented crawlspace	
<b>Fenestration</b>	<b>U-factor/SHGC:</b> Skylights Vertical	<u>Weighted U-Factor</u> ≤ 0.58 < 0.58	U-factor 0.32 0.32	SHGC (CZ2,4-16) 0.25 0.25	<b>Exceptions:</b> Altering any amount; Adding ≤ 16 ft <sup>2</sup> U-factor = 0.55/SHGC = 0.30 Altering ≤ 75 ft <sup>2</sup> if U-factor = 0.40. SHGC = 0.35 for CZ2,4,6-16	
	<b>Area:</b> Skylights Vertical	None	<b>Total area 20% CFA</b> West: CZ 2,4,6-16 cannot exceed 5% West: CZ 2,4,6-16 cannot exceed 5%		<b>Exceptions:</b> Replace any amount; Adding ≤ 16 ft <sup>2</sup> U-factor = 0.55. SHGC = 0.30 Replace any amount; Adding ≤ 75 ft <sup>2</sup> meeting Package A	