INTERNATIONAL CODE COUNCIL
2009/2010 CODE DEVELOPMENT CYCLE

2009/2010 FINAL ACTION AGENDA
UPDATE #2

INTERNATIONAL ENERGY CONSERVATION CODE®

Updated 10-22-10

October 25. 27-31, 2010

CHARLOTTE CONVENTION CENTER

CHARLOTTE, NC

EC13-09/10, Part I - Public Comment 23
Corrections to:
Column - Wood Frame Wall R-Value[i];
Rows - 6, 7 and 8

EC13-09/10, Part I

Public Comment 23:

Mark Halverson, representing APA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

TABLE 402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY Component

CLIMATE ZONE	FENESTRATION *U*-FACTOR	SKYLIGHT *U*-FACTOR	GLAZED FENESTRATION SHGC	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[k]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	NR	0.75	0.30	30	13	3/4	13	0	0	0
2	0.50[i]	0.65	0.30	30	13	4/6	13	0	0	0
3	0.40[i]	0.55	0.30[e]	38	13	5/8	19	5/13[f]	0	5 / 13
4 except Marine	0.35	0.55	NR	38	20 or 13+5[h]	8/13	19	10 / 13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h]	13/17	30[f g]	10/13	10,2ft	10/13
6	0.32	0.55	NR	49	20+5 or 13+10[h] or 24	15/20	30[g]	15/19	10,4ft	10/13
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h] or 24	19/21	38[g]	15/19	10,4ft	10/13

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 batts compressed into a nominal 2x6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. 15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 ft, whichever is less, in zones 1 through 3 for heated slabs.
e. There are no SHGC requirements in the Marine zone.
f. Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.
g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
h. First value is cavity insulation, second is continuous insulation, so "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required in the locations where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
i. The second R-value applies when more than half the insulation is on the interior of the mass wall.
j. For impact rated fenestration in wind-borne debris regions the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: The building code should be product neutral. It is not appropriate for the code to require builders in these climate zones to use a specific product class (insulated sheathing) to meet the prescriptive requirements when other reasonable options are available.

This modification to the original proposal adds R-24 cavity insulation only options (Table 2) to climate zones 6 through 8 to a level that exceeds the wood frame wall R-values in those climate zones in the 2006 IECC (Table 1) by approximately 30%. The R24 cavity insulation option is within 6% of the insulation value of the R-20 plus R-5 continuous insulation option (Table 3), but is 700% greater in R-value than the minimum required window glass (U-0.32) whose area has not been limited in past energy codes. There are R-20+ cavity insulation products available in North America including commonly found cavity insulations combined with spray-foam in "flash and batt" type applications and some spray-foam products.

This option will encourage further product innovation as well as greater options for the builders, including more cost effective ways to meet the structural requirements of the IRC. Considering that the U-values for windows in these same climate zones in EC13-09/10 increase efficiency by less than 10% over the 2006 IECC and the ceiling R-Values remain the same as the 2006, the R-24 requirement in wood frame walls in this Public Comment is significant and appropriate.

We ask the code body to support the committee's approval of this proposal as modified by this Public Comment.

Wall R-Value Comparison Calculations

Table 1. Base Case Wall 2006 IRC – Climate zones 6-8

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – ½" OSB	.55	0.55	
Fiberglass Batt		17.65*	
5 1/2" Stud	6.25		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c.	23%	77%	
Total Wall Component R-Values	**8.55**	**19.95**	
Total Wall Assembly R-Value	1.97	15.36	17.33

*6 1/2" R19 batt compressed into a 5 1/2" cavity

Table 2. Cavity Insulation Only Option – 2012 IECC – zones 6-8

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – ½" OSB	0.55	0.55	
Cavity Insulation		R24	
5 1/2" Stud	6.25		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**9.18**	**26.3**	
Total Wall Assembly R-Value	1.97	20.25	22.22

Table 3. Cavity Insulation Only Option – 2012 IECC – zones 6-8

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – 1" Foam	5.0	5.0	
Cavity Insulation		20	
5 1/2" Stud	6.25		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**13.0**	**26.75**	
Total Wall Assembly R-Value	2.99	20.59	23.59

EC157-09/10 Public Comment 3
Corrections to:
Column - 5 AND MARINE 4
Row - Wood framed and other

EC157-09/10

Public Comment 3:

Mark Halverson, representing APA, requests Approval as Modified by this Public Comment.

Modify the proposal as follows:

Table 502.2(1)
BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES

CLIMATE ZONE	**1**		**2**		**3**		**4 EXCEPT MARINE**		**5 AND MARINE 4**		**6**		**7**		**8**	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs																
Insulation entirely above deck	R-15 R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	R-20 R-25ci	R-20 R-25ci	R-20 R-25ci	R-20 R-25ci	R-20 R-30ci	R-20 R-30ci	R-25 R-35ci	R-25 R-35ci	R-25 R-35ci	R-25 R-35ci
Metal buildings (with R-5 R-3.5 thermal blocks [a,b])	R-19 R-19 + R11Ls	R-19 R-19 + R11Ls	R-13 + R-13 R-19 + R11Ls	R-13 + R-13 R-13 + R19	R-13 + R-13 R-19 + R11Ls	R-19 R-19 + R11Ls	R-13 + R-13 R-19 + R11Ls	R-19 R-19 + R11Ls	R-13 + R-13 R-19 + R11Ls	R-19 R-19 + R11Ls	R-13 + R-19 R-25 + R11Ls	R-19 R-25 + R11Ls	R-13 + R-19 R-30 + R11Ls	R-19 + R-10xx R-30 + R11Ls	R-11xx + R-19 R-30 + R11Ls	R-19 + R-10xx R-30 + R11Ls
Attic and other	R-30 R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38	R-38 R-49	R-38 R-49	R-38 R-49	R-38 R-49	R-49	R-49
Walls, Above Grade																
Mass	NR R-5.7ci	R-5.7ci	R-5.7ci	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci	R-15.2ci	R-15.2ci	R-25ci	R-25ci
Metal building[b]	R-16 R-13+ R-6,5c.i.	R-16 R-13+ R-6,5c.i.	R-16 R-13+ R-6,5c.i.	R-16 R-13+ R-13c.i.	R-19 R-13+ R-6,5c.i	R-16 R-13+ R-13c.i	R-16 R-13+ R-13c.i	R-16 R-13+ R-13c.i	R-13 + R-5.6ci R-13+ R-13c.i	R-13 + R-5.6ci R-13+ R-13c.i	R-13 + R-5.6ci R-13+ R-13c.i	R-13 + R-5.6ci R-13+ R-13c.i	R-19 + R-5.6ci R-13+ R-13c.i	R-19 + R-5.6ci R-13+ R-19.5c.i	R-19 + R-5.6ci R-13+ R-13c.i	R-19 + R-5.6ci R-13+ R-26c.i
Metal framed	R-13 + R-5 ci	R-13 + R-5 ci	R-13 + R-5 ci	R-13 + R-7.5ci	R-13 + R-3.8ci R-5 ci	R-13 + R-7.5ci	R-13 + R-7.5	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-15.6ci	R-13 + R-7.5ci	R-13 + R-18.8ci
Wood framed and other	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i or R-20	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8 7.5 c.i or R23.	R-13 + R-7.5 c.i. or R23	R-13 + R-7.5 c.i. or R23	R-13 + R-7.5ci or R23	R-13 + R-7.5ci or R23	R-13 + R-15.6ci or R30	R-13 + R-15.6ci or R30
Walls, Below Grade																
Below-grade wall[d]	NR	NR	NR	NR	NR	NR	NR R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci R-10ci	R-10ci	R-7.5ci R-10ci	R-12.5ci
Floors																
Mass	NR	NR	R-6.3ci	R-8.3ci	R-6.3ci R-10ci	R-8.3ci R-10ci	R-10ci	R-10.4ci	R-10ci	R-12.5ci	R-12.5ci	R-14.6ci	R-15ci	R-16.7ci	R-15ci	R-16.7ci
Joist/Framing	NR	NR	R-19	R-30	R-19	R-30	R-30	R-30	R-30	R-30	R-30	R-30[e]	R-30	R-30[e]	R-30[e]	R-30[e]
Slab-on-Grade Floors																
Unheated slabs	NR	NR	NR	NR	NR	NR	NR R-10 for 24	R-10 for 12 24 in.	NR R-10 for 24	R-10 for 24 in.	R-10 for 24 in.	R-15 for 24 in.	R-15 for 24 in.	R-15 for 24 in.	R-15 for 24 in.	R-20 for 24 in.

CLIMATE ZONE	**1**		**2**		**3**		**4 EXCEPT MARINE**		**5 AND MARINE 4**		**6**		**7**		**8**	
							in. below	below	in. below	below	below	below	below	below	below	below
Heated slabs	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-10 for 24 in. below	R-10 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 36 in. below	R-15 for 24 36 in. below	R-15 for 24 36 in. below	R-20 for 48 in. below	R-20 for 24 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below
Opaque Doors																
Swinging	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.61	U-0.70 U-0.37	U-0.70 U-0.37	U-0.70 U-0.37	U-0.70 U-0.37	U-0.50 U-0.37	U-0.50 U-0.37	U-0.50 U-0.37	U-0.50 U-0.37
Roll-up or sliding	U-1.45 R-4.75	U-1.45 R-4.75	U-1.45 R-4.75	U-1.45 R-4.75	U-1.45 R-4.75	U-1.45 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75	U-0.50 R-4.75

For SI: 1 inch = 25.4 mm.

ci = Continuous insulation. NR = No requirement.

a. When using *R*-value compliance method, a thermal spacer block is required, otherwise use the *U*-factor compliance method. [see Tables 502.1.2 and 502.2(2)].

b. Assembly descriptions can be found in Table 502.2(2).

c. R-5.7 ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in./h-f2 F.

d. When heated slabs are placed below grade, below-grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.

e. Steel floor joist systems shall to be R-38.

(Portions of code change proposal not shown remain unchanged)

Commenter's Reason: The building code should be product neutral. It is not appropriate for the code to require builders in these climate zones to use a specific product class (insulated sheathing) to meet the prescriptive requirements when other reasonable options are available.

This modification to the original proposal adds R23 cavity only insulation options to above grade wood framed walls in climate zones 5R through 7R, which is equivalent to the R13 + R7.5 continuous insulation option already found in the proposal. In addition, a R30 cavity only insulation option was added to climate zone 8. These options exceed the wood frame wall R-values in the 2006 IECC by 67% and 32%, respectively. Cavity only options in these climate zones will increase energy efficiency while facilitating a wider variety of exterior cladding options.

We ask the code body to support the committee's approval of this proposal as modified by this Public Comment.

Assembly Wall R-Value Calculations:

Table 1. Current 2012 IECC Climate zones 5R–7R (R13 + 7.5ci)

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – continuous insulation	7.5	7.5	
Sheathing – ½" OSB	0.55	0.55	
3 1/2" Fiberglass Batt		13.0	
3 1/2" Stud	4.38		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**14.18**	27.45	
Total Wall Assembly R-Value	3.26	17.56	20.82

Table 2. Base Case Wall 2006 IECC Climate zone 5-7

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – ½" OSB	.55	0.55	
3 1/2" Fiberglass Batt		13.0	
3 1/2" Stud	4.38		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**6.68**	**15.3**	
Total Wall Assembly R-Value	1.54	11.78	13.32

Table 3. Cavity Insulation Only Option 2012 IECC Climate zone 5-7

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – ½" OSB	0.55	0.55	
Cavity Insulation		23	
5 1/2" Stud	6.25		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**8.55**	**25.3**	
Total Wall Assembly R-Value	1.97	19.48	21.45

Table 4. Base Case Wall 2006 IECC Climate zone 8

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – continuous insulation	7.5	7.5	
Sheathing – ½" OSB	0.55	0.55	
3 1/2" Fiberglass Batt		13.0	
3 1/2" Stud	4.38		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	

Total Wall Component R-Values	**14.18**	27.45	
Total Wall Assembly R-Value	3.26	17.56	20.82

Table 5. Cavity Insulation Only Option 2012 IECC Climate zone 8

Component	R-Value Studs	R-Value Cavity	Assembly R-Value
Wall - Outside Air Film	0.17	0.17	
Siding Layer	0.45	0.45	
Sheathing – ½" OSB	0.55	0.55	
Cavity Insulation		30	
3 1/2" + 3 ½" Studs	8.75		
1/2" Drywall	0.45	0.45	
Inside Air Film	0.68	0.68	
Percent for 16" o.c. studs	23%	77%	
Total Wall Component R-Values	**11.05**	**32.3**	
Total Wall Assembly R-Value	2.54	24.87	27.41

EC176-09/10: Report of Hearing result should be as follows:

EC176-09/10

Committee Action: **Approved as Submitted**

Committee Reason: The committee felt the proposal clarified determination of energy equivalency and corrected an oversight in previous changes to the code.

Assembly Action: **None**