RE1–07/08
R202

Proponent: Gene Bassham, Fi-Foil Company, Inc., representing Reflective Insulation Manufacturers Association (RIMA)

Revise definition as follows:

CONDITIONED SPACE. For energy purposes, space within a building that is provided with heating and/or cooling equipment or systems capable of maintaining, through design or heat loss/gain, 50°F (10°C) during the heating season and 85°F (29°C) during the cooling season, or communicates ~~directly with~~ through a fixed opening that allows air flow to a conditioned space. For mechanical purposes, an area, room or space being heated or cooled by any equipment or appliance.

Reason: To better clarify the definition of "Conditioned Space."

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RE2–07/08
IRC N1101.2, N1104 (New), N1104.1 (New), N1104.2 (New), N1104.3 (New), N1104.4 (New), N1104.4.1 (New), N1104.4.2 (New), N1104.4.3 (New), N1104.5 (New), N1104.5.1 (New), N1104.5.2 (New), N1104.6 (New), N1104.6.1 (New), N1104.6.2 (New), N1104.6.3 (New), Table N1104.5.2(1) (New), Table N1104.5.2(2) (New); IECC 202, 401.2, 401.3, 402, 403, 404, 405 (New)

Proponent: Thomas D. Culp, Ph.D., Birch Point Consulting LLC; Thomas S. Zaremba, Roetzel & Andress

THIS PROPOSAL IS ON THE AGENDA OF THE IRC B/E AND THE IECC CODE DEVELOPMENT COMMITTEES AS 2 SEPARATE CODE CHANGES. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IRC

1. Revise as follows:

N1101.2 Compliance. Compliance shall be demonstrated by ~~either meeting the requirements of the *International Energy Conservation Code* or~~ meeting the requirements of ~~this chapter~~ Sections N1101, N1102.4, N1102.5, and N1103 and either:

1. Sections N1102.1 through N1102.3 (prescriptive); or
2. Section N1104 (performance).

Climate zones from Figure N1101.2 or Table N1101.2 shall be used in determining the applicable requirements from this chapter.

2. Add new text as follows:

SECTION N1104
SIMULATED PERFORMANCE ALTERNATIVE
(Performance)

N1104.1 Scope. This section establishes criteria for compliance using simulated energy performance analysis. Such analysis shall include heating, cooling, and service water heating energy only.

N1104.2 Mandatory requirements. Compliance with this Section requires that the criteria of Sections N1101, N1102.4, N1102.5, and N1103 be met.

N1104.3 Performance-based compliance. Compliance based on simulated energy performance requires that a proposed residence (proposed design) be shown to have an annual energy cost that is less than or equal to the annual energy cost of the standard reference design. Energy prices shall be taken from a source approved by the code official, such as the Department of Energy, Energy Information Administration's *State Energy Price and Expenditure Report*. Code officials shall be permitted to require time-of-use pricing in energy cost calculations.

Exception: Jurisdictions that require site energy (1kWh = 3,413 Btu) rather than energy cost as the metric of comparison.

N1104.4 Documentation.

N1104.4.1 Compliance software tools. Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the code official.

N1104.4.2 Compliance report. Compliance software tools shall generate a report that documents that the proposed design complies in accordance with Section N1104.3. The compliance documentation shall include the following information:

1. Address or other identification of the residence;
2. An inspection checklist documenting the building component characteristics of the proposed design as listed in Table N1105.5.2(1). The inspection checklist shall show results for both the standard reference design and the proposed design, and shall document all inputs entered by the user necessary to reproduce the results;
3. Name of individual completing the compliance report; and
4. Name and version of the compliance software tool.

Exception: Multiple Orientations. When an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements in each of the four cardinal (north, east, south and west) orientations.

N1104.4.3 Additional documentation. The code official shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the standard reference design
2. A certification signed by the builder providing the building component characteristics of the proposed design as given in Table N1104.5.2(1).

N1104.5 Calculation procedure.

N1104.5.1 General. Except as specified by this section, the standard reference design and proposed design shall be configured and analyzed using identical methods and techniques.

N1104.5.2 Residence specifications. The standard reference design and proposed design shall be configured and analyzed as specified by Table N1104.5.2(1). Table N1104.5.2(1) shall include by reference all notes contained in Table N1102.1.

N1104.6 Calculation software tools.

N1104.6.1 Minimum capabilities. Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the standard reference design and the proposed design and shall include the following capabilities:

1. Computer generation of the standard reference design using only the input for the proposed design. The calculation procedure shall not allow the user to directly modify the building component characteristics of the standard reference design
2. Calculation of whole-building (as a single zone) sizing for the heating and cooling equipment in the standard reference design residence in accordance with Section M1401.3.
3. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air conditioning equipment based on climate and equipment sizing.
4. Printed code official inspection checklist listing each of the proposed design component characteristics from Table N1104.5.2(1) determined by the analysis to provide compliance, along with their respective performance ratings (e.g. *R*-Value, *U*-Factor, SHGC, HSPF, AFUE, SEER, EF, etc.).

N1104.6.2 Specific approval. Performance analysis tools meeting the applicable sections of N1104 shall be permitted to be approved. Tools are permitted to be approved based on meeting a specified threshold for a jurisdiction. The code official shall be permitted to approve tools for a specified application or limited scope.

N1104.6.3 Input values. When calculations require input values not specified by Sections N1102, N1103 and N1104, those input values shall be taken from an approved source.

TABLE N1104.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass wall if proposed wall is mass: otherwise wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-Factor: from Table N1102.1.2	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Basement and crawlspace walls	Type: same as proposed	As proposed
	Gross area: same as proposed	As proposed
	U-Factor: from Table N1102.1.2 with insulation layer on interior side of walls	As proposed
Above-grade floors	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-Factor: from Table N1102.1.2	As proposed
Ceilings	Type: wood frame	As proposed
	Gross area: same as proposed	As proposed
	U-Factor: from Table N1102.1.2	As proposed
Roofs	Type: composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed
Attics	Type: vented with aperture = 1 ft^2 per 300 ft^2 ceiling area	As proposed
Foundations	Type: same as proposed	As proposed
Doors	Area: 40 ft^2	As proposed
	Orientation: North	As proposed
	U-factor: same as fenestration from Table N1102.1.2	As proposed
Glazing[a]	Total area[b] =	As proposed
	(a) The proposed glazing area; where the proposed glazing area is less than 18% of the conditioned floor area	
	(b) 18% of the conditioned floor area; where the proposed glazing area is 18% or more of the conditioned floor area	
	Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W)	As proposed
	U-factor: from Table N1102.1	As proposed
	SHGC: From Table N1102.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used	As proposed
	Interior shade fraction: Summer (all hours when cooling is required) = 0.70 Winter (all hours when heating is required) = 0.85	Same as standard reference design[c]
	External shading: none	As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	Specific Leakage Area (SLA)d = 0.00036 assuming no energy recovery	For residences that are not tested, the same as the standard reference design For residences without mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate[e] but not less than 0.35 ACH For residences with mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange ratee combined with the mechanical ventilation rate,[f] which shall not be less than 0.01 × *CFA* + 7.5 × (*Nbr*+1) where: *CFA* = conditioned floor area *Nbr* = number of bedrooms
Mechanical ventilation	None, except where mechanical ventilation is specified by the proposed design, in which case: Annual vent fan energy use: kWh/yr = 0.03942 × CFA + 29.565 × (*Nbr*+1) where: *CFA* = conditioned floor area *Nbr* = number of bedrooms	As proposed
Internal gains	IGain = 17,900 + 23.8 × *CFA* + 4104 × *Nbr* (Btu/day per dwelling unit)	Same as standard reference design
Internal mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area	Same as standard reference design, plus any additional mass specifically designed as a thermal storage element[g] but not integral to the building envelope or structure
Structural mass	For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air For masonry basement walls, as proposed, but with insulation required by Table N1102.1.2 located on the interior side of the walls For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed As proposed As proposed
Heating systems[h, i]	Fuel type: same as proposed design Efficiencies: Electric: air-source heat pump with prevailing federal minimum efficiency Nonelectric furnaces: natural gas furnace with prevailing federal minimum efficiency Nonelectric boilers: natural gas boiler with prevailing federal minimum efficiency Capacity: sized in accordance with Section M1401.3	As proposed As proposed As proposed As proposed As proposed
Cooling systems[h, j]	Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section M1401.3	As proposed As proposed As proposed
Service Water Heating[h, k]	Fuel type: same as proposed design Efficiency: in accordance with prevailing federal minimum standards Use: gal/day=30 + (10 x *Nbr*)	As proposed As proposed Same as standard reference

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Thermal distribution systems	A thermal distribution system efficiency (DSE) of 0.80 shall be applied to both the heating and cooling system efficiencies	Same as standard reference design, except as specified by Table N1104.5.2(2)
Thermostat	Type: manual, cooling temperature set point = 78°F; heating temperature set point = 68°F	Same as standard reference design

For SI: 1 square foot = 0.93 m^2; 1 British thermal unit = 1055 J; 1 pound per square foot = 4.88 kg/m^2; 1 gallon (U.S.) = 3.785 L; °C = (°F-32)/1.8.

a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50% of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area: AF = As x FA x F
where:
AF = Total glazing area.
As = Standard reference design total glazing area.
FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 x below-grade boundary wall area).
F = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.
and where:
Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.
Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.
Below-grade boundary wall is any thermal boundary wall in soil contact.
Common wall area is the area of walls shared with an adjoining dwelling unit.

c. For fenestrations facing within 15 degrees (0.26 rad) of true south that are directly coupled to thermal storage mass, the winter interior shade fraction shall be permitted to be increased to 0.95 in the proposed design.

d. Where Leakage Area (L) is defined in accordance with Section 5.1 of ASHRAE 119 and where:
SLA = L/CFA
where L and CFA are in the same units.

e. Tested envelope leakage shall be determined and documented by an independent party approved by the code official. Hourly calculations as specified in the 2001 ASHRAE *Handbook of Fundamentals*, Chapter 26, page 26.21, Equation 40 (Sherman-Grimsrud model) or the equivalent shall be used to determine the energy loads resulting from infiltration.

f. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals* page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.

g. Thermal Storage Element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

h. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

i. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be used for the standard reference design.

j. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

k. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum Energy Factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

TABLE N1104.5.2(2)
DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION:	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	**0.80**	**0.95**
Distribution systems entirely located in conditioned space[c]	**0.88**	**1.00**
Proposed "reduced leakage" with entire air distribution system located in the conditioned space[d]	**0.96**	**--**
Proposed "reduced leakage" air distribution system with components located in the unconditioned space	**0.88**	**--**
"Ductless" systems[e]	**1.00**	**--**

For SI: 1 cubic foot per minute = 0.47 L/s; 1 square foot = 0.093 m^2; 1 pound per square inch = 6895 Pa; 1 inch water gauge = 1250 Pa.

a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

b. Hydronic Systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed loop piping and that do not depend on ducted, forced air flows to maintain space temperatures.

c. Entire system in conditioned space shall mean that no component of the distribution system, including the air handler unit, is located outside of the conditioned space.

d. Proposed "reduced leakage" shall mean leakage to outdoors not greater than 3 cfm per 100 ft^2 of conditioned floor area and total leakage not greater than 9 cfm per 100 ft^2 of conditioned floor area at a pressure differential of 0.02 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Total leakage of not greater than 3 cfm per 100 ft^2 of conditioned floor area at a pressure difference of 0.02 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure, shall be deemed to meet this requirement without measurement of leakage to outdoors. This performance shall be specified as required in the construction documents and confirmed through field-testing of installed systems as documented by an approved independent party.

e. Ductless systems may have forced airflow across a coil but shall not have any ducted airflows external to the manufacturer's air handler enclosure.

PART II – IECC

1. Revise as follows:

SECTION 202
GENERAL DEFINITIONS

RESIDENTIAL BUILDING. For this code, ~~includes R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.~~ detached one- and two-family dwellings or multiple single-family dwellings (townhouses) not more than three stories above-grade in height with a separate means of egress.

401.2 Compliance. Projects shall comply with Chapter 11 of the *International Residential Code*. ~~Sections 401, 402.4, 402.5, 402.6 and 403 (referred to as the mandatory provisions) and either:~~

~~1. Sections 402.1 through 402.3 (prescriptive); or~~
~~2. Section 404 (performance).~~

2. Delete without substitution:

~~**401.3 Certificate.** A permanent certificate shall be posted on or in the electrical distribution panel. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant *R*-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; *U*-factors for fenestration; and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the type and efficiency of heating, cooling and service water heating equipment.~~

~~**SECTION 402**~~
~~**BUILDING THERMAL ENVELOPE**~~

~~**SECTION 403**~~
~~**SYSTEMS**~~

~~**SECTION 404 (Supp)**~~
~~**ELECTRICAL POWER AND LIGHTING SYSTEMS**~~

~~**SECTION 405 (Supp)**~~
~~**SIMULATED PERFORMANCE ALTERNATIVE**~~

Reason: The purpose of this proposal is to place the residential provisions of the energy code in one place, rather than having potentially different requirements in the IRC and the IECC. To accomplish this purpose, the definition of residential buildings is modified to be consistent with the scope of the IRC, the requirements in the residential chapter are replaced with a reference to Chapter 11 of the IRC, and the residential performance alternative (section 405) is inserted without change into the IRC.

Over the last few code cycles, there have been numerous hours spent debating the same proposals before two different committees, and strong debates about whether or not the IRC and IECC requirements should always be identical. Although the IRC and IECC residential requirements are currently very similar with some small variations, they are likely to continue to deviate in the future, as they did prior to the 2004 rewrite of the code. This is an inefficient and counterproductive way to function, especially considering the extremely valuable contributions of code officials, interested parties, and the ICC organization and staff in developing these codes.

In this proposal, the commercial provisions of the code remain in the IECC. This allows the IECC committee to focus on commercial buildings, which already present very complex variations and issues, without having to try to be experts in both residential and commercial applications. The residential provisions would remain under the expertise of the IRC B/E committee, as they are today.

Currently, the IRC and IECC residential requirements are essentially the same with some small variations, so this change will not significantly change the requirements for most buildings. One difference is that apartment buildings not more than three stories above grade would now fall under the commercial provisions of the IECC, similar to apartment buildings over three stories high. This is due to the way the IRC scope is limited to one- and two-family dwellings and townhouses / rowhomes with a separate means of egress.

Finally, one of the most important reasons to adopt this proposal is that it would increase use of the residential energy code. The IRC is much more widely adopted than the IECC, and having a single residential energy code to promote and enforce is to the benefit of the public, code officials, and the ICC organization.

Cost Impact: The code change proposal will not increase the cost of construction.

PART I – IRC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IECC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RE3–07/08
N1101, N1102, N1103

Proponent: Brian Dean, ICF International, representing the Energy Efficient Codes Coalition; Bill Prindle, American Council for an Energy Efficient Economy (ACEEE); Jeff Harris, Alliance to Save Energy (ASE); Steven Rosenstock, Edison Electric Institute (EEI)

Delete Sections N1101, N1102 and N1103 in their entirety and substitute as follows:

SECTION N1101

N1101.1 General. Residential buildings shall comply with the *International Energy Conservation Code* (IECC).

Reason: This code change is intended to simplify the code development process and increase consistency and enforceability in the energy efficiency requirements.

The IECC is the nationally-recognized energy efficient building code for residential buildings. It is referenced numerous times in federal law, including as a basis for tax credits. Federal law requires states to consider adoption of the latest version of the IECC, once DOE has determined that it is an improvement over previous versions.

The IBC already references the IECC, rather than creating a separate, independent energy code chapter. A similar approach is reasonable for the IRC. It should be noted that the IRC already recognizes the IECC as an option.

The current process requires coordination in language and requirements. At a minimum, this is a time and resource consuming process, since many code changes have to be heard twice, once by the IECC committee and then by the IRC committee; as well as twice at the final action hearings. Moreover, actual coordination may not be achieved, resulting in an IECC and IRC that differ. These differences violate ICC procedures requiring consistency.

The existence of two versions of residential building energy requirements (one in the IECC and one in the IRC) also creates confusion when the codes are adopted and enforced. Advocates who support the IECC may be forced to oppose adoption of the IRC without amendments. If a jurisdiction adopts both the IECC and IRC, it may establish inconsistent requirements leading to confusion in the field and compliance and enforcement problems.

By having a single document focused on the energy efficiency of buildings, better coordination and reduced confusion between the documents will occur.

Cost Impact: The code change proposal will not increase the cost of construction. The code change proposal will decrease the cost to create and modify code language.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RE4–07/08
N1101.9 (New)

Proponent: Craig Conner, Building Quality, representing himself

Add new text as follows:

N1101.9 Performance-based compliance. Provisions of this code shall be permitted to be used to define the standard reference design used for performance-based compliance under Section 405 of the IECC.

Reason: Performance-based compliance is allowed by the IRC's reference to the IECC. Where the IRC is used, the IRC's provisions should be acceptable as a way to define the "code-minimum home" (standard reference design) to which the proposed building is compared.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RE5–07/08
Table N1102.1, Table N1102.1.2, N1102.1.2, N1102.2.3

Proponents: Craig Conner, Building Quality, representing himself; Ronald Majette, U.S. Department of Energy

Revise as follows:

TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[h]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[h]	FLOOR R-VALUE	BASEMENT[c] WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	CRAWL SPACE[c] WALL R-VALUE
1	1.2	0.75	0.40	30	13	3/4	13	0	0	0
2	0.75	0.75	0.40	30	13	4/6	13	0	0	0
3	0.65	0.65	0.40[e]	30	13	5/8	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5[g]	13/17	30[f]	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13+5[g]	15/19	30[f]	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	30[f]	10/13	10, 4 ft	10/13

a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 insulation shall be permitted to be compressed into a 2× 6 cavity.
b. The fenestration *U*-factor column excludes skylights. The solar heat gain coefficient (SHGC) column applies to all glazed fenestration.
c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
d. R-5 shall be added to the required slab edge *R*-values for heated slabs.
e. There are no solar heat gain coefficient (SHGC) requirements in the Marine Zone.
f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
g. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than25%of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
h. The second R-value applies when more than half the insulation is on the interior of the mass wall.

TABLE N1102.1.2
EQUIVALENT U-FACTORS[a]

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor[b]	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.060	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in zone 1, 0.14 in zone 2, 0.12 in zone 3, 0.10 in zone 4 except Marine, and the same as the frame wall U-factor in Marine zone 4 and zones 5 through 8.

N1102.1.2 *U*-factor alternative. An assembly with a *U*-factor equal to or less than that specified in Table N1102.1.2 shall be permitted as an alternative to the *R*-value in Table N1102.1.

~~**Exception:** For mass walls not meeting the criterion for insulation location in Section N1102.2.3, the *U*-factor shall be permitted to be:~~

~~1. *U*-factor of 0.17 in Climate Zone 1~~
~~2. *U*-factor of 0.14 in Climate Zone 2~~
~~3. *U*-factor of 0.12 in Climate Zone 3~~
~~4. *U*-factor of 0.10 in Climate Zone 4 except Marine~~
~~5. *U*-factor of 0.082 in Climate Zone 5 and Marine 4~~

N1102.2.3 Mass walls. Mass walls for this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs. ~~The provisions of Section N1102.1 for mass walls shall be applicable when at least 50 percent of the required insulation *R*-value is on the exterior of, or integral to, the wall. Walls not meeting this criterion for insulation placement shall meet the wood frame wall insulation requirements of Section N1102.~~1.

~~1. *R*-value of 4 in Climate Zone 1~~
~~2. *R*-value of 6 in Climate Zone 2~~
~~3. *R*-value of 8 in Climate Zone 3~~
~~4. *R*-value of 10 in Climate Zone 4 except Marine~~
~~5. *R*-value of 13 in climate Zone 5 and Marine 4~~

Reason: (Conner) The IRC mass wall insulation requirements are confusing as written. Moving the mass wall R-values and U-factors to their respective tables makes the requirements clearer. This is a format change, not a change in requirements. Where there were small differences in the IRC and IECC requirements, the two were realigned.

This change also clarifies that basement walls are not mass walls.

The same change was approved in the IECC during the last code change cycle.

Reason: (Majette) The purpose of this code change is to match the mass wall requirements in the IRC to those in the IECC both in format and requirements. In the 2006 I-Codes, the IECC had more stringent mass wall requirements than the IRC. In the 06/07 code change cycle, a proposed code change (EC34-06/07) suggested to match up the IRC and IECC by lowering some of the IECC requirements and raising some of the IRC requirements. This was a reasonable and fair compromise. The proposal for the IECC was approved but the corresponding proposal for the IRC was not.

The new proposal presented here reproduces the proposed requirements in EC34-06/07 for the IRC. This would increase the mass wall insulation from R-13 to R-17 in climate zone 5 and Marine zone 4 in the IRC when the insulation is towards the inside surface of the wall relative to the mass (with a corresponding change to the U-factor requirements). This would still leave the mass wall requirements less stringent than the wood-frame wall requirements of R-19 in zone 5 and Marine 4. The heat storage benefits of mass are mitigated when the mass is to the outside of the insulation because the insulation blocks the heat transfer from the mass to inside of the building. Therefore, the reduction in insulation requirements for a wall with mass on the outside should be minimal relative to a low-mass wall such as a wood frame wall.

As mentioned above, this change would also simplify the format of the mass wall requirements and match the format and requirements of the IECC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RE6–07/08
Table N1102.1, Table N1102.1.2

Proponent: Martha G. VanGeem, CTL Group, representing the Masonry Alliance for Codes and Standards

Revise as follows:

TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

Climate Zone	Fenestration U-Factor	Skylight[b] U-Factor	Glazed Fenestration SHGC	Ceiling R-Value	Wood Frame Wall R-value	Mass Wall R-value[h]	Floor R-Value	Basement[c] Wall R-Value	Slab[d] R-value & Depth	Crawl Space[c] Wall r-value
1	1.20	0.75	0.40	30	13	3/4	13	0	0	0
2	0.75	0.75	0.40	30	13	4/6	13	0	0	0
3	0.65	0.65	0.40[e]	30	13	5 /8	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5 /10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5[g]	13/13	30[f]	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13+5[g]	15/19	30[f]	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	30[f]	10/13	10, 4 ft	10/13

a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 insulation shall be permitted to be compressed into a 2× 6 cavity.
b. The fenestration *U*-factor column excludes skylights. The solar heat gain coefficient (SHGC) column applies to all glazed fenestration.
c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
d. R-5 shall be added to the required slab edge *R*-values for heated slabs.
e. There are no solar heat gain coefficient (SHGC) requirements in the Marine Zone.
f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
g. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than25%of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
h. The second R-value applies when more than half the insulation is on the interior.

TABLE N1102.1.2
EQUIVALENT U-FACTORS[a]

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor[b]	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.060	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in zone 1, 0.14 in zone 2, 0.12 in zone 3, 0.10 in zone 4 except Marine, 0.082 in zone 5 and Marine 4, and the same as the frame wall U-factor zones 6 through 8.

N1102.1.2 *U*-factor alternative. An assembly with a *U*-factor equal to or less than that specified in Table N1102.1.2 shall be permitted as an alternative to the *R*-value in Table N1102.1.

~~**Exception:** For mass walls not meeting the criterion for insulation location in Section N1102.2.3, the *U*-factor shall be permitted to be:~~

~~1. *U*-factor of 0.17 in Climate Zone 1~~
~~2. *U*-factor of 0.14 in Climate Zone 2~~
~~3. *U*-factor of 0.12 in Climate Zone 3~~
~~4. *U*-factor of 0.10 in Climate Zone 4 except Marine~~
~~5. *U*-factor of 0.082 in Climate Zone 5 and Marine 4~~

N1102.2.3 Mass walls. Mass walls, for the purposes of this chapter, shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs. ~~The provisions of Section N1102.1 for mass walls shall be applicable when at least 50 percent of the required insulation *R* value is on the exterior of, or integral to, the wall. Walls that do not meet this criterion for insulation placement shall meet the wood frame wall insulation requirements of Section N1102.1.~~

~~**Exception:** For walls that do not meet this criterion for insulation placement, the minimum added insulation R-value shall be permitted to be:~~

~~1. *R*-value of 4 in Climate Zone 1~~
~~2. *R*-value of 6 in Climate Zone 2~~
~~3. *R*-value of 8 in Climate Zone 3~~
~~4. *R*-value of 10 in Climate Zone 4 except Marine~~
~~5. *R*-value of 13 in climate Zone 5 and Marine 4~~

Reason: This code change proposal simplifies the format of the mass wall requirements to match the format of the IECC.

Cost Impact: The code change proposal will not increase the cost of construction.

Public Hearing: Committee: AS AM D
Assembly: ASF AMF DF

RE7–07/08
Table N1102.1

Proponent: Ronald Majette, U.S. Department of Energy

Revise table as follows:

TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[h]	FLOOR R-VALUE	BASEMENT[c] WALL R-VALUE	SLAB[d] R-VALUE & DEPTH	CRAWL SPACE[c] WALL R-VALUE
1	1.2	0.75	~~0.40~~ 0.37	30	13	3	13	0	0	0
2	0.75	0.75	~~0.40~~ 0.37	30	13	4	13	0	0	0
3	0.65	0.65	0.40[e]	30	13	5	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5[g]	13	30[f]	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13+5[g]	15	30[f]	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19	30[f]	10/13	10, 4 ft	10/13

(Footnotes not shown remain unchanged)

Reason: The purpose of these proposed changes to the SHGC requirements for hot climates (zones 1 & 2) in the IRC is to match the corresponding requirements in the IECC. These are also equal to those contained in Table 5.2 of ANSI/ASHRAE Standard 90.2-2004 *Energy-Efficient Design of Low-Rise Residential Buildings*.

The 0.40 SHGC requirement for residential buildings in the I-Codes was established in 1997 when SHGC ratings by the National Fenestration Rating Council (NFRC) was still in its infancy and few products were rated and therefore is not necessarily the most appropriate value. Today, these SHGC values are widely available and often the norm.

SHGC ratings for all horizontal slider windows from the on-line NFRC database were reviewed in July 2005. There were 50,367 products, of which 35,114 were rated for SHGC. The most common product used to meet the 0.40 SHGC requirement are low-E windows. Low-E technologies have experienced dramatic growth in the last decade and are now included in over 60% percent of the residential market (Door & Window Maker Magazine, April 2005). There are 13,672 horizontal slider double-glazed low-E windows that are rated for SHGC and 93% of these are 0.37 SHGC or below. Lower SHGC levels can be easily met by windows with any type of frames. For example, 91%, 94%, and 97% of rated low-E horizontal slider windows with aluminum, vinyl, and wood frames now easily meet (or are lower than) this proposed 0.37 SHGC requirement.

Cost Impact: There will most likely be no cost impact from this code proposal since these technologies are now the norm and widely available in all climate zones.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

RE8–07/08
N1102.4.3

Proponent: Chuck Murray, Washington State University Extension Energy Program, representing Northwest Energy Code Group

Revise as follows:

N1102.4.3 Recessed lighting. Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaries shall be IC-rated and labeled as meeting ASTM E 283 when tested at 1.57 psi (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the conditioned space to the ceiling cavity. All recessed luminaries and shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering. ~~By being:~~

~~1. IC-rated and labeled with enclosures that are sealed or gasketed to prevent air leakage to the ceiling cavity or unconditioned space; or~~
~~2. IC-rated and labeled as meeting ASTM E 283 when tested at 1.57 pounds per square foot (75 Pa) pressure differential with no more than 2.0 cubic feet per minute (0.944 L/s) of air movement from the conditioned space to the ceiling cavity; or~~
~~3. Located inside an airtight sealed box with clearances of at least 0.5 inch (13 mm) from combustible material and 3 inches (76 mm) from insulation.~~

Reason: This language is included in the 2007 supplement to the IECC. It is being submitted here for consistency.

Air leakage testing for recessed fixtures has been an option for compliance in energy codes since 1991. At that time the fixtures market was not ready for mandatory testing of all fixtures, so alternatives were included in the code. In 2005, the California Energy Code mandated testing of all recessed luminaries. This made a significant change in the market place. This market is now ready for a uniform standard for air sealing, verified through testing.

Inspections and building air leakage testing by WSU noted that even when sealed luminaries are used, air leakage will occur if the luminaries are not properly sealed to the wall or ceiling covering. Text has been added to emphasize the importance of installation practices that include sealing details. We do not think this is a new requirement, simply a clarification.

Luminaries installed in airtight sealed box are inside the thermal envelope. This application would not require air tight luminaries. The code text for option 3 is not needed.

The purpose of the code change proposal is to require testing of all recessed luminaries installed in insulated assembly. Add a requirement to seal the fixture to the penetration in the assembly. Delete unneeded text.

Cost Impact: The code change proposal will increase the cost of construction.

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF
