
2003/2004 INTERNATIONAL ENERGY CONSERVATION CODE DEVELOPMENT COMMITTEE

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INTERNATIONAL ENERGY CONSERVATION CODE HEARING RESULTS

EC1-03/04

Committee Action: Disapproved

Committee Reason: While there is some merit in moving technical requirements from the administrative chapter, the requirements of the NFRC apply to both residential and non-residential uses. Moving the provisions to Chapter 6 instead of a general section such as in Chapter 3 or a new general chapter, would limit their application to residential uses. In addition, it appears that some of the existing code provisions have been lost in the rearrangement.

Assembly Action: None

EC2-03/04

Committee Action: Disapproved

Committee Reason: While testing and comparing Long Term Thermal Resistance (LTTR) is a good method to judge products, this current standard only applies to a limited segment of products. Due to the limitations of the code text and standard, the majority of the products would not be addressed by these requirements. As an example, the standard applies to "thermal insulation board" and would not address spray applied materials nor would it address products with other types of facings. Industry as well as the Federal Trade Commission is currently reviewing whether the LTTR method should be applied to other products.

Assembly Action: None

EC3-03/04

Committee Action: Disapproved

Committee Reason: Two of the standards which are referenced (ASTM C236 and C976) have been withdrawn by ASTM and have been replaced by ASTM C1363. Therefore, the proposed references are out of date. Without those standards there is not a method for doing full scale testing instead of determining by calculation. The floor discussion indicated fact that several groups are working to resolve some issues and will bring forward a proposal which make the application easier to understand and enforce. Additionally, the standards must be shown to comply with the ICC Standards Criteria.

Assembly Action: None

EC4-03/04

Committee Action: Disapproved

Committee Reason: This proposal points out the need for commissioning of systems which is a topic which needs to be covered so that performance may be verified. There were concerns

regarding the fact that it was limited to commercial systems and also the potential costs/benefits if this was applied to residential uses. Much of this is covered under Section 104 of EC 48-03/04 which the committee approved. The wording is excessive and difficult to enforce. In addition problems with text in 105.3 regarding what the building official is to do along with conditional acceptance provisions which are already addressed in the building code and some of the standards items which are covered by the mechanical code were cited.

Assembly Action: None

EC5-03/04

Item 1 (IECC)

Committee Action: Approved as Submitted

Committee Reason: The definition adds consistency between the IRC, IBC and IECC. Additionally it is consistent with the definition in NFRC which is used by the IECC.

Assembly Action: None

Item 2 (IRC)

Committee Action: Approved as Submitted

Committee Reason: Based on proponent's published reason.

Assembly Action: None

EC6-03/04

Committee Action: Approved as Modified

Modification: Replace proposed definition with the following:

SOLAR HEAT GAIN COEFFICIENT (SHGC). The ratio of the solar heat gain entering the space area through the fenestration assembly to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation which is then re-radiated, conducted or convected into the space.

Committee Reason: Provides definition for a term which is often used in the IECC. Modified definition is derived from NFRC 200 definition which is the basis for the SHGC ratings in the IECC. This definition expands on the definition which was approved as a part of the action of EC48-03/04.

It is the committee's intent that this definition in EC6-03/04 replace the definition which is included and approved in EC48-03/04. This item was heard and approved after EC48-03/04 was approved.

Assembly Action: None

EC7-03/04

Committee Action: Approved as Submitted

Committee Reason: The proposed numbers provide a means of establishing a base for design and equipment sizing. Provisions are

only for design conditions and not for occupant comfort. Resolves uncertainty regarding what number should be used and places the numbers within the code versus only being located within a standard. While there was some discussion regarding what exact numbers are appropriate, it was felt that it was more important to provide a number for consistency. In addition, since some designs are done by software which use other methods acceptable in the IECC versus the ASHRAE standard, it is important to specify what design numbers should be used.

Assembly Action: **None**

EC8-03/04 **Withdrawn by Proponent**

EC9-03/04

Committee Action: **Disapproved**

Committee Reason: While there some is some value in looking at the long term benefit of improving or establishing a minimum requirement for the envelope, it is very difficult to look at the long term trade-off for the envelope versus a shorter term benefit for the equipment. Of primary concern was the imposition of prescriptive requirements in the performance section of the code. Additionally, while the code text refers to "walls" the tables only address wood frame walls and would not be applicable to mass walls or steel walls and would not adequately address this difference. The floor discussion indicated the provision was only intended for wood frame walls. Chapter 5 adequately addresses performance approach and provides design options without imposing these minimums. The proposal is an "over-simplification" of the energy compliance process. This may result in long term detrimental effects on the occupants including creating conditions for condensation, mold, and less comfort for the occupants.

Assembly Action: **None**

EC10-03/04 **Withdrawn by Proponent**

EC11-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Based on the proponent's reasoning and that it makes sense not to have the "standard design" based a requirement which is not available in the marketplace. The revised SHGC will permit more products and provide a realistic number which is used in the standard design which may then be compared to the proposed design. The selected value provides a number which is available in the marketplace and more appropriate than the existing 0.68 which is found in the current code.

Assembly Action: **None**

EC12-03/04

Committee Action: **Disapproved**

Committee Reason: There was a lack of justification for trade-off of the SHGC with the *U*-factor and uncertainty regarding the justification of trading those items off in the various climate zones. The concept of trading those two items off is too new and unjustified at this point for inclusion into the code. The proposal does not adequately consider the variation of energy demand under both heating and cooling loads. The proposed change in the SHGC would reduce one of the major methods of reducing the cooling load that is found within the code. Disapproval is consistent with the committee's action on EC48-03/04 since it would bring back window/wall ratios.

Assembly Action: **None**

EC13-03/04 **Withdrawn by Proponent**

EC14-03/04

Committee Action: **Disapproved**

Committee Reason: Includes definitions for categories which are not within the scope of the IECC since they address spaces which are not conditioned. The provisions are not compatible with provisions which are found within the IRC.

Assembly Action: **None**

EC15-03/04 **Withdrawn by Proponent**

EC16-03/04

Committee Action: **Disapproved**

Committee Reason: Based upon the committee action on EC17. The committee's preference was for EC17 since the exception is in one area and is easier for the code official to understand what is intended.

Assembly Action: **None**

EC17-03/04

Committee Action: **Approved as Submitted**

Committee Reason: The exception clearly explains what is intended and when it may be used. The proposal better explains what is currently permitted by the code and is easier to understand.

Assembly Action: **None**

EC18-03/04

Committee Action: **Disapproved**

Committee Reason: The proponent's reason states that the requirements are based on ASHRAE 90.2 and the testimony indicated

that the provisions of ASHRAE 90.2 are currently being revised and are proposing a revision of the requirements for resistant heat. The proposed language does not provide clarity and since electric heating is not a common method of heating new construction, it is not necessary to include the requirements at this time.

Assembly Action: **None**

EC19-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC19, EC43 and EC21. Although there were advantages in using terms which are consistent with what industry uses and creates a consistent method of measuring insulation performance by using K-values and equivalent R-values there was not adequate information given to justify changing from the existing provisions. The proposal also addresses domestic and service hot water systems in residential uses which are not currently regulated in the IECC. The proposed values although based on the ASHRAE 90.1 values are less than what is currently required in the code, and the proposal is more complex than the existing provisions. Because the proposal is based on ASHRAE 90.1 there was concern regarding applying it to residential uses when it was developed for commercial applications. In addition, on the commercial side, Chapter 8 is an alternative to the ASHRAE 90.1 provisions found in Chapter 7. Adopting portions of ASHRAE 90.1 into Chapter 8 takes away some of the alternative value of the chapter. A complete and consistent package which addresses space heating and cooling as well as service water heating in commercial occupancies is needed. These proposals do not provide this consistency.

Assembly Action: **None**

EC20-03/04

Committee Action: **Disapproved**

Committee Reason: Although intended to apply to residential uses, the last item of the proposal will essentially eliminate most residential systems. Disapproval is consistent with the action on EC48-03/04. EC48-03/04 was heard and approved prior to hearing this proposal and this section has been deleted based on the action on EC48-03/04.

Assembly Action: **None**

EC21-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC19, EC43 and EC21. Although there were advantages in using terms which are consistent with what industry uses and creates a consistent method of measuring insulation performance by using K-values and equivalent R-values there was not adequate information given to justify changing from the existing provisions. The proposal also addresses domestic and service hot water systems in residential uses which are not currently regulated in the IECC. The proposed values although based on the ASHRAE 90.1 values are less than what is currently required

in the code, and the proposal is more complex than the existing provisions. Because the proposal is based on ASHRAE 90.1 there was concern regarding applying it to residential uses when it was developed for commercial applications. In addition, on the commercial side, Chapter 8 is an alternative to the ASHRAE 90.1 provisions found in Chapter 7. Adopting portions of ASHRAE 90.1 into Chapter 8 takes away some of the alternative value of the chapter. A complete and consistent package which addresses space heating and cooling as well as service water heating in commercial occupancies is needed. These proposals do not provide this consistency.

Assembly Action: **None**

EC22-03/04

Committee Action: **Disapproved**

Committee Reason: The proponent indicated the proposal requires revisions. There was wide support for the idea of duct testing and sealing and although it is a good method of reducing energy loss and is cost effective, it should not be traded off for the long term envelope provisions. It is questionable how it could be accomplished since there is no connection between ducts and windows or the remainder of the envelope which justify any type of trade-off. Enforcement is difficult when the trade-off is tied to the building envelope. It is questionable on how compliance would be gained if after completion of the envelope the duct system fails to meet the required design level. Concern was also expressed regarding trading off long term benefits such as what the envelope provides against the short term benefit which is provided by many duct-sealing methods.

Assembly Action: **None**

EC23-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC23, EC24 and EC25. Although the proposed standard addresses an item which was not adequately addressed by the NFRC, it is better for DASMA and NFRC to work together to modify the NFRC standard to address both topics instead of having multiple standards. This proposal would also establish an inconsistency within the code since it is only being placed within Chapter 6. Such an action would make Chapter 5 and Chapter 6 inconsistent. There was also concern regarding how garage doors with glazing would be regulated since the code would still apply the requirements of NFRC 200.

Assembly Action: **None**

EC24-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC23, EC24 and EC25. Although the proposed standard addresses an item which was not adequately addressed by the NFRC, it is better for DASMA and NFRC to work together to modify the NFRC standard to address both topics instead of having multiple standards. This proposal would also establish an inconsistency within the code since it is only being placed

within Chapter 6. Such an action would make Chapter 5 and Chapter 6 inconsistent. There was also concern regarding how garage doors with glazing would be regulated since the code would still apply the requirements of NFRC 200.

Assembly Action: **None**

EC25-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC23, EC24 and EC25. Although the proposed standard addresses an item which was not adequately addressed by the NFRC, it is better for DASMA and NFRC to work together to modify the NFRC standard to address both topics instead of having multiple standards. This proposal would also establish an inconsistency within the code since it is only being placed within Chapter 6. Such an action would make Chapter 5 and Chapter 6 inconsistent. There was also concern regarding how garage doors with glazing would be regulated since the code would still apply the requirements of NFRC 200.

Assembly Action: **None**

EC26-03/04

Committee Action: **Disapproved**

Committee Reason: The intent of this proposal is to provide an alternate path of compliance and offer additional consumer product choices which is not a code issue. The trade offs permitted by this method are already permitted by Chapter 4 even though in most situations people will not take advantage of it and continue to use the simplified prescriptive method. The provisions of Chapter 6 were developed to create a simple prescriptive compliance path and this proposal moves away from that intent and really provides something which is already available in Chapter 4. The comparison does not model the exact figures which are proposed by this item.

Assembly Action: **None**

EC27-03/04

Item 1 (IECC)

Committee Action: **Disapproved**

Committee Reason: ASTM C1363 has replaced both ASTM C 236 and ASTM C976 although only one of the standards has been proposed for deletion. Since ASTM C1363 was not submitted or available for review or discussion by the committee, it was felt to be inappropriate to accept the proposal at this time. Approved code change EC48-03/04 which was heard and approved prior to this proposal has deleted this section.

Assembly Action: **None**

Item 2 (IRC)

Committee Action: **Approved as Submitted**

Committee Reason: Based on proponent's published reason.

Assembly Action: **None**

EC28-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action which was taken for Section 402.2.2 of EC48. The provisions reduce the ceiling requirements without adequate justification for items such as cathedral ceilings even though other less traditional methods of compliance are available. The use of rigid insulation in such situations is one method of meeting the requirements which currently exist in the code. Since the number of cathedral ceilings is fairly small, complying with the code does not create an undue burden on the builder. The wording in the proposed Section 602.1.2.2 which states the "design of the roof/ceiling assembly does not allow sufficient space" was viewed as an issue because it is the design which has created this situation/difficulty in the first place.

Assembly Action: **None**

EC29-03/04

Committee Action: **Disapproved**

Committee Reason: There is a need for a simple system to address these common small commercial structures and the types of systems being used within them, however, this proposal is not adequate. Concerns were expressed regarding how the intended change will match up with actions which were previously taken with EC48. Specifically Section 702.1 and the reference to Section 502 since EC48 permits unlimited glazing area. There was no documentation that the proposal's prescriptive method is either equal to or more restrictive than the existing IECC performance based provisions.

Assembly Action: **None**

EC30-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Based on proponent's published reason. The provisions makes no change in the code requirements but simply will make it easier to reference the commercial provisions. Additionally combining the two chapters should make it clearer that commercial buildings can comply with either ASHRAE 90.1 (the existing Chapter 7) or the "design by acceptable practice" methodology which is in the existing Chapter 8.

Assembly Action: **None**

EC31-03/04

Committee Action: **Approved as Modified**

Modify proposal as follows:

802.2.1 Above-grade walls. The minimum thermal resistance (R-value) of the insulating material(s) installed in the wall cavity between

the framing members and continuously on the walls shall be as specified in Table 802.2(1), based on framing type and construction materials used in the wall assembly. The *R*-value of integral insulation installed in concrete masonry units (CMU) shall not be used in determining compliance with Table 802.2(1). "Mass walls" shall include walls weighing at least (1) 35 pounds per square foot (170 kg/m²) of wall surface area or (2) 25 pounds per square foot (120 kg/m²) of wall surface area if the material weight is not more than 120 pounds per cubic foot (1,900 kg/m³), and do not include CMU's less than 8 inches (203 mm) nominal thickness.

802.2.2 Opaque doors. Opaque doors (doors having less than 50% glass area) shall meet the applicable requirements for doors as specified in Table 802.2(1) and be considered as part of the gross area of above-grade walls that are part of the building envelope. ~~Man doors are typically hinged doors used by occupants for ingress or egress. Utility doors are typically larger overhead, rollup, or sectional doors used for vehicle access or transfer of goods.~~

802.2.4 Roof assembly. The minimum thermal resistance (*R*-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table 802.2.(1), based on construction materials used in the roof assembly.

Exception: Continuously insulated roof assemblies where the thickness of insulation varies 1 inch (25.4 mm) or less and where the area weighted U-factor is equivalent to the same assembly with the R-value specified in Table 802.2.2(1).

**TABLE 802.2(1)
BUILDING ENVELOPE REQUIREMENTS – OPAQUE ELEMENTS**

CLIMATE ZONE	1	2	3	4 except Marine	5 and Marine 4	6	7	8
Roofs								
Insulation Entirely above Deck	R-15 ci	R-15 ci	R-15 ci	R-15 ci	R-20 ci	R-20 ci	R-25 ci	R-25 ci
Metal Buildings (with R-5 thermal blocks ¹) ²	R-19 + R-10	R-19	R-19	R-19	R-19	R-19	R-19 + R-10	R-19 + R-10
Attic and Other	R-30	R-30	R-30	R-30	R-30	R-30	R-38	R-38
Walls, Above Grade								
Mass, exterior insulation	NR	NR	R-5.7 ci ^{3,5}	R-5.7 ci ³	R-7.6 ci	R-9.5 ci	R-11.4 ci	R-13.3 ci
Metal Building ²	R-13	R-13	R-13	R-13	R-13 + R-13	R-13 + R-13	R-13 + R-13	R-13 + R-13
Metal Framed	R-13	R-13	R-13	R-13	R-13 + R-3.8 ci	R-13 + R-3.8 ci	R-13 + R-7.5 ci	R-13 + R-7.5 ci
Wood Framed and Other	R-13	R-13	R-13	R-13	R-13	R-13	R-13	R-13 + R-7.5 ci
Walls, Below Grade								
Below grade wall ⁴	NR	NR	NR	NR	NR	NR	R-7.5 ci	R-7.5 ci
Floors								
Mass	NR	R-5 ci	R-5 ci	R-10 ci	R-10 ci	R-10 ci	R-15 ci	R-15 ci
Joist/Framing	NR	R-19	R-19	R-19	R-19	R-30	R-30	R-30
Slab-on-Grade Floors								
Unheated Slabs	NR	NR	NR	NR	NR	NR	NR	R-10 for 24 in. 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-7.5 for 24 in. below	R-10 for 36 in. below	R-10 for 36 in. below	R-10 for 48 in. below
Opaque Doors								
Swinging	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.50
Roll-up or Sliding	U – 1.45	U – 1.45	U – 1.45	U – 1.45	U – 1.45	U – 0.50	U – 0.50	U – 0.50

ci – continuous insulation

NR – No Requirement

1. Thermal blocks are a minimum R-5 of rigid insulation, which extends 1" beyond the width of the purlin on each side, perpendicular to the purlin.
2. Assembly descriptions can be found in Table 802.1(3)
3. R-5.7 ci may be substituted with ASTM C90 concrete block walls, ungrouted or partially grouted at 32 in. or less on center vertically and 48 in. or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in./h-f² F.
4. 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.
5. Insulation is not required for mass walls in Climate Zone 3A located below the "Warm-Humid" line, and in Zone 3B.

**TABLE 802.2(2)
BUILDING ENVELOPE REQUIREMENTS – FENESTRATION**

Climate Zone	1	2	3	4 except Marine	5 and Marine 4	6	7	8
Windows (40% maximum)								
Factory-assembled <u>glazed</u> fenestration products								
U-Factor	1.20	<u>0.75</u>	<u>0.65</u>	0.40	0.35	0.35	0.35	0.35
SHGC	0.40	0.40	0.40	0.40	0.40	<u>0.40</u>	NR	NR
Site-built <u>glazed</u> products								
U-Factor	1.20	<u>0.75</u>	<u>0.65</u>	<u>0.50</u>	<u>0.45</u>	<u>0.45</u>	<u>0.45</u>	<u>0.45</u>
SHGC: PF < 0.25	0.25	0.25	0.25	0.40	0.40	0.40	NR	NR
SHGC: 0.25 < PF < 0.5	0.33	0.33	0.33	NR	NR	NR	NR	NR
SHGC: PF ≥ 0.5	0.40	0.40	0.40	NR	NR	NR	NR	NR
Skylights (3% maximum)								
Glass								
U-Factor	1.60	1.05	0.90	0.60	0.60	0.60	0.60	0.60
SHGC	0.40	0.40	0.40	0.40	0.40	0.40	NR	NR
Plastic								
U-Factor	1.90	1.90	1.30	1.30	1.30	0.90	0.90	0.60
SHGC	0.35	0.35	0.35	0.62	0.62	0.62	NR	NR

NR = No requirement

FACTORY-ASSEMBLED GLAZED FENESTRATION PRODUCT. Fenestration products that are shipped to the field as factory-assembled units comprised of specified framing frame and glazing components including: operable and fixed windows; and skylights.

SITE-BUILT GLAZED PRODUCT. Fenestration products that are designed to be field glazed or field assembled units comprised of specified framing frame and glazing components including: operable and fixed windows; curtain walls, window walls, storefronts, sloped glazing and skylights.

(Remainder approved as proposed)

Committee Reason: Provide a simplified compliance option and provide some consistency with portions of the ASHRAE 90.1 provisions. This proposal continues the move towards simplification by creating only the one glazing limit versus the multiple ranges which exist in the current IECC. This revision in the number of ranges does not however coordinate with the ASHRAE 90.1 which would still be available as an option. The proposal provides some parallel changes dealing with commercial buildings which follow changes that EC48 has made on the residential side. The original modification which was submitted at the hearings revised the climate zones to coordinate with those found in EC48. Additional modification of the climate zone titles were made by the committee to use the exact same language as that proposed by EC48. Based on a proposed modification which was offered from the floor and due to the actions the committee took on EC48, the U-factors for site-built fenestration products were modified in all zones except zone 1. This modification makes the U-factors somewhat less restrictive than the original proposal but also makes

them less stringent than the factory-assembled requirements. This modification will make the U-factors for both factory assembled and site-built items in the mild climates (zones 1, 2 and 3 match the values in the modified EC48. In the colder climates (zones 4 except Marine, 5 and Marine 4, 6, 7 and 8) the site-built U-factor was modified to achieve an average U-factor between the factory-built and site-built items that is equivalent to the existing IECC while still allowing a slightly higher value for the site-built products which tend to be constructed with an aluminum frame.

The deletion and substitution of Tables 802.2(1) through 802.2(4), includes the deletion of current Tables 802.2(5) through 802.2(37) as these tables are currently accessed only through footnotes in current Tables 802.2(1) through 802.2(4) which are to be deleted by this proposed change.

Assembly Action:

None

EC32-03/04

Committee Action:

Disapproved

Committee Reason: Based upon the proponent's request at the meeting and in response to the committee's action on EC31. Because of the action taken on EC31, the proponent's original intent of coordinating Section 802 with the revised climate zones found in EC48 has been accomplished.

Assembly Action: **None**

EC33-03/04 **Withdrawn by Proponent**

EC34-03/04 **Withdrawn by Proponent**

EC35-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Provides greater consistency with ASHRAE 90.1 which is the basis for the changes in the maximum leakage rate that is being proposed.

Assembly Action: **None**

EC36-03/04

Committee Action: **Approved as Modified**

Modify proposal as follows:

803.2.4 Hydronic system controls. Hydronic systems of at least ~~300,000-British thermal units per hour-Btu/h~~ (87,930W) design output capacity supplying heated and chilled water to comfort conditioning systems shall include controls that meet the requirements of Section 803.3.3.7.

Committee Reason: The proposal clarifies that the system's output capacity be used. The modifications coordinate and eliminate some inconsistencies which were found in this section and in Section 803.3.3.7.4 which is the subject of proposal EC42. This modification creates consistency between the simple and complex mechanical system approaches and with ASHRAE 90.1.

Assembly Action: **None**

EC37-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Adds threshold requirements for energy recovery ventilation systems. This approach is appropriate for the simple systems approach since there are systems which fall within the scope of the simple systems section and because ASHRAE 90.1 does contain a threshold requirement. This proposal creates consistency with the ASHRAE 90.1.

Assembly Action: **None**

EC38-03/04

Committee Action: **Approved as Modified**

Modify proposal as follows:

TABLE 803.2.6(2)
EQUIPMENT EFFICIENCY PERFORMANCE
EXCEPTION FOR ECONOMIZERS

CLIMATE ZONES	COOLING EQUIPMENT PERFORMANCE IMPROVEMENT (EER OR COP IPLV)
2B	10% Efficiency Improvement
3B	15% Efficiency Improvement
4B	20% Efficiency Improvement

(Remainder approved as proposed)

Committee Reason: Coordinates the economizer provisions with the climate zone changes which have been made by other proposals such as EC48 which the committee approved. Modification of what was essentially a typo revised "COP" in the table to be "IPLV." This will permit the trade-off table to be used in buildings which have chillers. This change was made because there are very few chillers which would have a high enough Coefficient of Performance (COP) to qualify for the trade-off but many of them can meet the Integrated Part-Load Value (IPLV) and therefore qualify for the trade-off.

Assembly Action: **None**

EC39-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Coordinates the IECC with a change which was approved by the IMC committee (M62-03/04) and matches text which already exists in the IRC. This brings the marking requirements directly into the code and should improve and ease enforcement. The standard is currently referenced in the IECC but this proposal brings the marking requirement into the code to help clarify what is required.

Assembly Action: **None**

EC40-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Adds threshold requirements for energy recovery ventilation systems. This closes a gap between the prescriptive approaches in the IECC and ASHRAE 90.1 and will provide better consistency with the ASHRAE 90.1 which does provide these thresholds.

Assembly Action: **None**

EC41-03/04

Committee Action: **Approved as Submitted**

Committee Reason: The deletion of the wording "up to" 100 percent clarifies the intended application of the code. The intent is not to exempt the water economizers when they can only meet a part of the expected load.

Assembly Action: **None**

EC42-03/04

Committee Action: **Approved as Submitted**

Committee Reason: This change provides additional clarity to the code by specifying that it is the equipment's "output" capacity which is the threshold for this requirement. This action will match the committee action on EC36. In addition the inclusion of the word "or" at two locations demonstrates that there are three separate options which may be used and that not all three are required.

Assembly Action: **None**

EC43-03/04

Committee Action: **Disapproved**

Committee Reason: Consistent with the action on EC19, EC43 and EC21. Although there were advantages in using terms which are consistent with what industry uses and creates a consistent method of measuring insulation performance by using K-values and equivalent R-values there was not adequate information given to justify changing from the existing provisions. The proposal also addresses domestic and service hot water systems in residential uses which are not currently regulated in the IECC. The proposed values although based on the ASHRAE 90.1 values were considered to be less than what is currently required in the code, and the proposal was considered as being more complex than the existing provisions. Because the proposal is based on ASHRAE 90.1 there was concern regarding applying it to residential uses when it was developed for commercial applications. In addition, on the commercial side, Chapter 8 is an alternative to the ASHRAE 90.1 provisions found in Chapter 7. Adopting portions of ASHRAE 90.1 into Chapter 8 takes away some of the alternative value of the chapter. A complete and consistent package which addresses space heating and cooling as well as service water heating in commercial occupancies is needed. These proposals do not provide this consistency.

Assembly Action: **None**

EC44-03/04

Committee Action: **Approved as Modified**

Modify proposal as follows:

804.7 Pools. Pools shall be provided with energy conserving measures in accordance with Sections 804.7.1 ~~and 804.7.2~~ through 804.7.3

804.7.1 Pool heaters. (No changes to proposed text)

804.7.2 Time switches. (No changes to proposed text or exceptions)

804.7.3 Pool covers. Heated pools shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more

than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12 (R-2.1).

Exception: Pools deriving over 60% of the energy for heating from site-recovered energy or solar energy source.

Committee Reason: This proposal closes a gap between the requirements for commercial pools when Chapter 8 is used instead of Chapter 7. Such pools are addressed and regulated by the ASHRAE 90.1 requirements in Chapter 7 but there is no corresponding section within Chapter 8 to address them. The modification aligns the IECC with the ASHRAE 90.1. As submitted, the proposal coordinates with 2 of the 3 requirements found in the ASHRAE document. The modification adds the third item which is the requirements for pool covers and a related exception which are found in Section 7.2.5.2 of the ASHRAE 90.1.

Assembly Action: **None**

EC45-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Makes the code more explicit in how it deals with guest room lighting and eliminates some confusion regarding what switching requirements apply to the guestroom lighting.

Assembly Action: **None**

EC46-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Based on the proponent's original reason. This clarifies the code and make certain that the comparison of the lighting looks at all lighting in both conditioned and non-conditioned areas.

Assembly Action: **None**

EC47-03/04

Committee Action: **Disapproved**

Committee Reason: While there was general support of the concept of this proposal and a belief that there is a need for transformer efficiency to be addressed in the code, the current proposal simply leaves too many questions and issues unaddressed. Efficiency ratings alone do not address the overall performance. Items such as core loss at partial loading should be considered since the loss for high-efficiency transformers at such loadings may exceed the core loss of transformers that are currently available. The tables which are proposed for inclusion into the code are based on an older addition of the NEMA TP-1 standard and are not the same as the tables which are found in the current 2002 edition of the standard. The committee encouraged the various speakers on this item to work together and bring this issue back in the future since it is needed in the code.

Assembly Action: **None**

EC48-03/04

Items 1, 4, 6, 8 and 10 (IECC)

Committee Action: **Approved as Modified**

Modify Items 1, 4, 6, 8 and 10 of proposal as follows:

**TABLE 102.1.3
DEFAULT GLAZED FENESTRATION U-FACTORS**

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			SINGLE	DOUBLE
Metal	1.20	0.80	1.60	1.05
Non-Metal or metal-clad	0.95	0.55	1.25	0.80
Glazed Block	0.60			

**TABLE 102.1.3(1)
U-FACTOR DEFAULT TABLE FOR WINDOWS,
GLAZED DOORS AND SKYLIGHTS**

FRAME MATERIAL AND PRODUCT TYPE ^a	SINGLE GLAZED	DOUBLE GLAZED
<u>Metal without thermal break</u>		
<u>Operable (including sliding and swinging glass doors)</u>		
Fixed	1.27	0.87
Garden window	1.13	0.69
Curtain wall	2.60	1.81
Skylight	1.22	0.79
Site-assembled sloped/overhead glazing	1.98	1.31
glazing	1.36	0.82
<u>Metal without thermal break</u>		
<u>Operable (including sliding and swinging glass doors)</u>		
Fixed	1.08	0.65
Curtain wall	1.07	0.63
Skylight	1.11	0.68
Site-assembled sloped/overhead glazing	1.89	1.11
glazing	1.25	0.70
<u>Reinforced vinyl/metal clad wood</u>		
<u>Operable (including sliding and swinging glass doors)</u>		
Fixed	0.90	0.57
Skylight	0.98	0.56
Skylight	1.75	1.05
<u>Wood/vinyl/fiberglass</u>		
<u>Operable (including sliding and swinging glass doors)</u>		
Fixed	0.89	0.55
Garden Window	0.98	0.56
Skylight	2.31	1.61
Skylight	1.47	0.84

(a) Glass block assemblies with mortar but without reinforcing or framing shall have a U-factor of 0.60.

102.1.3 Fenestration product rating. U-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled U-factor shall be assigned a default U-factor from Table 102.1.3(1) or 102.1.3(2). The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC shall be assigned a default SHGC of 0.75 for single pane and 0.65 for double pane and glazed block from Table 102.1.3(3).

**TABLE 102.1.3(2)
U-FACTOR DEFAULT TABLE FOR
NONGLAZED DOORS**

DOOR TYPE	WITHOUT FOAM CORE	WITH FOAM CORE
Steel doors (1.75 inches thick)	0.60	0.35
	WITHOUT STORM DOOR	WITH STORM DOOR
Wood doors (1.75 inches thick)		
Panel with 0.438-inch panels	0.54	0.36
Hollow Core flush panels	0.46	0.32
Panel with 1.125-inch panels	0.39	0.28
Solid core flush	0.40	0.26

For SI: 1 inch = 25.4 mm.

**TABLE 102.1.3(3)
SHGC DEFAULT TABLE FOR FENESTRATION**

PRODUCT DESCRIPTION	SINGLE GLAZED				DOUBLE GLAZED			
	Clear	Bronze	Green	Gray	Clear ± Clear	Bronze ± Clear	Green ± Clear	Gray ± Clear
Metal frames								
Operable	0.75	0.64	0.62	0.61	0.66	0.55	0.53	0.52
Fixed	0.78	0.67	0.65	0.64	0.68	0.57	0.55	0.54
Nonmetal frames								
Operable	0.63	0.54	0.53	0.52	0.55	0.46	0.45	0.44
Fixed	0.75	0.64	0.62	0.61	0.66	0.54	0.53	0.52

102.2 Installation. All materials, systems and equipment shall be installed in accordance with the manufacturer's installation instructions and the conditions of any listing or required certifications International Building Code.

102.2.1 Protection of exposed foundation insulation. Insulation applied to the exterior of ~~foundation~~ basement walls, crawlspace walls and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed exterior insulation and extend a minimum of 6 inches (153 mm) below grade.

~~**103.1.1 Above code programs.** The code official or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code. Buildings approved in writing by such an energy efficiency program shall be considered in compliance with this code.~~

105.1 General. Construction or work for which a permit is required shall be ~~inspected~~ subject to inspection by the code official.

301.1 General. Climate zones from Figure 301.1 or Table 301.1 shall be used in determining the applicable requirements from Chapters 4 and 5. Locations not in Table 301.1 (outside the US) shall be assigned a climate zone based on Section 301.3.

401.3 Certificate. A permanent certificate shall be posted ~~inside the building~~ 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, where requirements apply, 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.

402.1.2 U-factor alternative. An assembly with a U-factor equal to or less than that specified in Table 402.1.2 shall be permitted as an alternative to the R-value in Table 402.1.

Exception: For mass walls not meeting the criterion for insulation location in Section 402.2.3 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

402.1.3 Total UA alternative. If the total building thermal envelope UA (sum of U-factor times assembly area) is less than or equal to the total UA resulting from using the U-factors in Table 402.1.2 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table 402.1. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

~~**402.1.4 Prescriptive trade offs.** The trade offs specified in Table 402.1.4 shall be permitted as an alternative to Table 402.1.~~

~~**402.2.2 Ceilings without attic spaces.** Where Section 402.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30.~~

402.2.3 Mass walls. Mass walls for the purposes this Chapter shall be considered 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 402.1 for mass walls shall be applicable when at least 50% 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 402.1.

Exception: For walls that do not meet the 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

402.5 Moisture control. The building design shall not create conditions of accelerated deterioration from moisture condensation. Above grade frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.

Exceptions:

1. In construction where moisture or its freezing will not damage the materials.
2. Frame walls, floors and ceilings in jurisdictions in Zones 1 through 5 ~~4~~. (Crawl space floor vapor retarders are not exempted.)

3. Where other approved means to avoid condensation are provided.

402.5.1 Maximum fenestration U-factor and SHGC. The maximum fenestration U-factor permitted using trade offs from Section 402.1.3 or Section 404 in zones 6 through 8 shall be ~~0.55~~ 0.40. The maximum fenestration SHGC permitted using trade-offs from Section 404 in zones 1 through 3 shall be 0.50.

403.2.1 Insulation. Supply and return ducts shall be insulated to a minimum of R-8. Ducts in floor trusses shall be insulated to a minimum of R-6.

Exception: Ducts or portions thereof located completely inside the building thermal envelope ~~or within the building thermal envelope and separated from the exterior of the building thermal envelope with at least R-8 insulation.~~

**TABLE 402.1
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	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^e WALL R-VALUE
1	1.20	1.60 <u>0.75</u>	0.40	30	13	6 <u>3</u>	13	0	0	0
2	0.80 <u>0.75</u>	1.05 <u>0.75</u>	0.40	30	13	6 <u>4</u>	13	0	0	0
3	0.60 <u>0.65</u>	0.90 <u>0.65</u>	0.40 ^e	30	13 <u>15</u>	6 <u>5</u>	19	0	0	5 / 13
4 except Marine	0.40	0.60	NR	38	13 <u>15</u>	8 <u>5</u>	19	10 / 13	10, 2 ft	10 / 13
5 and Marine 4	0.35	0.60	NR	38	13 <u>21</u> or <u>15+5</u> ^g	13	25 ^f	10 / 13	10, 2 ft	10 / 13
6	0.35	0.60	NR	49	13 <u>21</u> or <u>15+5</u> ^g	15	30 ^f	10 / 13	10, 4 ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	24 <u>19</u>	30 ^f	15 / 21	15, 4 ft	10 / 13

- a. R-values are minimums. U-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2 x 6 cavity.
- b. The fenestration U-factor column excludes skylights. The 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 SHGC requirements in the Marine zone.
- f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- g. "~~13~~ 15+5" means ~~R-13~~ R-15 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 than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

**TABLE 402.1.2
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	1.20	1.60	0.035	0.082	0.140 0.197	0.064	0.360	0.477
2	0.80	1.05	0.035	0.082	0.140 0.165	0.064	0.360	0.477
3	0.60	0.90	0.035	0.082	0.140 0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.099 0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.037	0.059	0.065
6	0.35	0.60	0.026	0.060	0.077 0.059	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057 0.053	0.033	0.041	0.057

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

**TABLE 402.1.4
HVAC SYSTEM TRADEOFFS**

CLIMATE ZONE(S)	REQUIRED IMPROVEMENT FOR HVAC SYSTEM	ALLOWED ALTERNATIVES FOR INSULATION/FENESTRATION [†]
2	SEER 13 OR Ducts & HVAC in conditioned space OR Ground source heat pump	Any fenestration U factor
3	SEER 13 with AFUE 90 OR SEER 13 with HSPF 7.9 OR Ducts & HVAC in conditioned space OR Ground source heat pump	Double pane window with any U factor
4 or 5	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-0 unconditioned basement R-0 slab R-19 floor
5	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-13 wall R-19 floor
6	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-38 ceiling R-13 wall
7	AFUE 92 OR HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-38 ceiling R-15 wall

1. Table 402.1 requirements not stated remain the same. All footnotes of Table 402.1 apply.

2. After the year 2006 the SEER shall be increased by 2 from the value in this table; HSPF shall increase from 7.9 to 8.5 and from 8.2 to 8.8.

3. In zones 3 through 8 dwelling units with electric resistance heating are not eligible to use this table.

4. "Ducts & HVAC in conditioned space" includes air handler and furnace being in conditioned space. Factory-sealed air handlers tested, listed and labeled by the manufacturer as having a 2% or less leakage rate at 1.0 inch water gauge shall meet the requirement for air handler being in conditioned space.

5. For the uninsulated unconditioned basements trade-off in Zones 4 and 5, at most one foot of the basement wall can be above grade. Any combination of the foundation insulation specified shall be permitted.

6. Slabs with uninsulated hot water pipes, uninsulated air distribution ducts or electric heating cables installed within or under the slab are not eligible for this tradeoff of slab edge insulation.

7. Evaporative cooling shall meet the SEER requirement if code official has deemed evaporative cooling appropriate to the climate of the jurisdiction.

8. Marine zone residences without mechanical air conditioning shall be exempt from the SEER requirement in this table.

(In Table 404.5.2(1) only the "glazing" and "above grade walls" portions changed. All other "Building Components" and the footnotes remain unchanged. Unchanged portions not reproduced in this monograph.)

**TABLE 404.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above grade walls:	Type: <u>mass wall if proposed wall is mass; otherwise wood frame</u> Gross area: same as proposed U-Factor: from Table 402.1.2 Solar absorptance = 0.75 Emittance = 0.90	As proposed As proposed As proposed As proposed As proposed
Glazing: ^a	Total area ^b = 48% <u>of conditioned floor area</u> <u>Proposed glazing area</u> Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W) U-factor: from Table 402.1.2 SHGC: from Table 402.1 except that for climates with no requirement (NR) SHGC = 0.55 shall be used Interior shade fraction: Summer (all hours when cooling is required) = 0.70 Winter (all hours when heating is required) = 0.85 External shading: none	As proposed As proposed As proposed As proposed Same as standard reference design ^c As proposed

**TABLE 404.5.2(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 "leak free" <u>"reduced leakage"</u> with entire air distribution system located in the conditioned space ^d	0.96	
Proposed "leak free" <u>"reduced leakage"</u> air distribution system with components located in the unconditioned space	0.88	
"Ductless" systems ^e	1.00	

- 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 ~~"leak free"~~ "reduced leakage" shall mean leakage to outdoors not greater than 3 cfm per 100 ft² of conditioned floor area and total leakage not greater than 9 cfm per 100 ft² of conditioned floor area at a pressure differential of 25 Pascal across the entire system, including the manufacturer's air handler enclosure. Total leakage of not greater than 3 cfm per 100 ft² of conditioned floor area at a pressure difference of 25 Pascal 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.

(Remainder of proposed change as submitted)

Committee Reason: Approval of this item provides consistency with the simplification of the requirements which was approved by the IRC committees which had previously acted on EC48 items 11 through 19. Simplifying the requirements will hopefully improve and make the requirements easier to understand and also enforce. By making the code easier to apply it is hoped that the result will be more complying buildings which will therefore improve energy conservation. The intent is that this revision keeps the levels of energy performance at the levels which currently exist in the code. One of the primary things which make this proposal easier to apply than the existing provisions is the elimination of the window/wall ratios. This proposal should not only be easier for the plans examiner to determine if the plans will be in compliance but it will also make the inspectors job easier in not only determining compliance, but also in helping to explain the provisions to people in the field. There was concern expressed regarding the number of modifications which were offered from the floor and the justification for them.

See the committee action and reason with EC6-03/04. It was the committee's intent that the definition of SHGC given in item EC6-03/04 replace the definition which was approved as a part of proposal EC48-03/04. Item EC48-03/04 was heard and approved as the first item on the hearing agenda and when Item EC6-03/04 was heard later, it was the committee's intent to replace the definition in EC48-03/04 with the definition given in EC6-03/04.

The modifications to the original proposal were made for the following reasons:

Table 102.1.3. It was felt that the default tables which were given for the U-factor were overly abbreviated and therefore the default tables from the current code (Tables 102.5.2(1) and 102.5.2(2)) were retained.

Section 102.1.3 the default table for SHGC from the current code (Table 102.5.2(3)) was added back into the proposal instead of merely specifying the values for single and double pane glazing. The testimony indicated that the original proposal was felt to be too much of an over simplification. The opaque door table from the existing code was also added back in.

Section 102.2 revised the reference to be to the IBC since it already contains instructions on how to install windows.

Section 102.2.1 was modified to clarify the application of the provisions to various walls.

Section 103.1.1 which dealt with local, state or national programs which exceed the IECC requirements was deleted. It was not viewed as being consistent with the code since it basically permitted ignoring the code and would need to be expanded to give the code official guidance on applying the provision. It was also felt that the code official already has this authority.

Section 301.1 was revised to include Figure 301.1.1 as a means for determining the appropriate climate zone for various locations. The figure was already included in the original proposal, but a reference to it was missing.

Section 401.3 was modified for practical as well as editorial reasons to clarify the required location for the certificate.

Table 402.1 changes specific values which bring the provisions more in line with the current prescriptive requirements and to also deal with the fact that there is no glazing limit. Because of the permitted amount of glazing, certain figures affecting the glass and wall area requirements are made more conservative. The mass wall provisions

were modified in the lower climate zones based on what was believed appropriate for the added R-value. This mass wall revision was also coordinated with the changes in the U-factors for mass walls in Table 402.1.2.

Section 402.1.2. This change coordinates with the added exception in Section 402.2.3 allowing the added R-value to be made on the interior of the wall.

Table 402.1.2. The modification in the U-factor for mass walls was done based on changes made to the mass wall R-values in Table 402.1 in order to be consistent.

Section 402.1.3 is simply to clarify that the UA alternative which is determined must be applied to the same assembly area as used in the proposed design.

Section 402.1.4 and Table 402.1.4 regarding the system trade-offs are deleted since they are currently not allowed in the IECC. It was also felt to be inconsistent with the current requirements since there is a UA and a performance path to take care of such issues. The code would also permit the "systems analysis approach" to make these types of changes and therefore the provisions do not need to be included in prescriptive option. Concern was also expressed regarding the trade-off of long term envelop performance versus shorter life of equipment. Additionally, it was felt that many of the items which trade-offs were being given for are essentially the current common practice and therefore no real gain is being obtained in order to trade.

Section 402.2.2 is deleting an exception which does not exist in the current IECC and is therefore more consistent with the current code. It also prevents people from intentionally building an assembly which they can not fit enough insulation into and therefore permitting them the reduction to R-30.

Section 402.2.3. This change is intended to continue the simplification and deal with mass walls in an appropriate manner. The provision applies when the insulation of a mass wall is on the interior an allows for the added R-value to be placed on the interior. This change is to go along with the modification in Section 402.1.2 dealing with the U factor. The values were considered as being consistent with the existing code. The values were derived from Chapter 5 equations and the mass wall factors for interior and exterior insulation.

Section 402.5 The main paragraph was revised to clarify that the framed wall statement applied to "above grade" locations. Exception 2 is modified to limit the exemption for vapor barriers to the warmer climate zones.

402.5.1 establishes a maximum SHGC and a minimum U-factor because there are no limitations on glass area under this proposal. If limitations are not provided it could lead to performance problems.

Section 403.2.1. The exception was modified to only eliminate the duct insulation requirement when the duct is completely within the building's thermal envelope. The modification eliminated language which some felt was redundant but which was intended apply to items such as ducts located within the cavity space of stud walls.

Table 404.5.2.1(1). The percentage of glazing was deleted from this performance path since the glazing limitation has been deleted from the prescriptive path. This assures consistency between the two approaches and should make the application of the provisions easier and more consistent.

Table 404.5.2(1). This modifications simply clarifies that a mass wall may be used to do the calculation to compare the standard and the proposed designs.

Table 404.5.2(2). The term "leak free" was replaced with "reduced leakage" both in the table and the footnote because the ducts will have a certain amount of leakage and this term is therefore more appropriate.

Assembly Action: **None**

Items 2 and 5 (IECC items by IEBC Committee)
Committee Action: **Approved as Modified**

Modify proposal as follows:

~~**101.4.2 Historic buildings.** Buildings, or portions thereof, specifically classified as historic buildings by the state or local jurisdiction, listed in The National Register of Historic Places, or determined eligible for such listing by a designated authority are exempt from this code.~~

101.4.2 Historic buildings. Any building or structure that is listed in the State or National Register of Historic Places; designated as a historic property under local or state designation law or survey; certified as a contributing resource with a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National or State Registers of Historic Places either individually or as a contributing building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places.

(Remainder of submittal as proposed)

Committee Reason: Adding the words, "are exempted from this code," to the definition will make it consistent with the *International Building Code*.

Assembly Action: **Disapproved**

Items 3, 7 and 9 (IECC Items by IMC Committee)
Committee Action: **Approved as Submitted**

Committee Reason: Based on proponent's published reason.

Assembly Action: **None**

Items 11, 12, 13, 14, 15, 16, 18 and 19 (IRC items by IRC Building/Energy Committee)
Committee Action: **Approved as Modified**

Modify proposal as follows:

Items 12, 13, 15, 16 & 18 No Change:

Modify Items 11, 14 & 19 as follows:

Item 11. D.

R318.1 Moisture control. (No change to current text)

Exceptions:

1. (No change to current text)
2. (No change to current text)
3. In counties identified as in climate zones 1 through 5 4 in Table N1101.2

R408.3 Unvented crawl space. Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where:

1. Exposed earth is covered with a continuous vapor retarder. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached and sealed to the stem wall,
2. And one of the following is provided for the under-floor space:
 - a. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cfm for each ~~20~~ 50 ft² of crawlspace floor area, including a return pathway (such as a duct or transfer grille to the common area), and perimeter walls insulated in accordance with Section N1102.2.8, or
 - b. Conditioned air supply sized to deliver at a rate equal to 1 cfm for each ~~20~~ 50 ft² of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille to the common area), and perimeter walls insulated in accordance with Section N1102.2.8, or
 - c. Plenum complying with M1601.4, if under floor spaces used as a plenum.

Item 11. F.

R806.4 Conditioned attic assemblies: Unvented conditioned attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) are permitted under the following conditions:

1. No interior vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly.
2. An air-impermeable insulation is applied in direct contact to the underside/interior of the structural roof deck. "Air-impermeable" shall be defined by ASTM E 283.

Exception: In zones 2B and 3B, insulation is not required to be air permeable.

3. In the warm humid locations as defined in N1101.2.1:
 - a. For asphalt roofing shingles: A 1 perm or less vapor retarder (determined using Procedure B of ASTM E 96) is placed to the exterior of the structural roof deck; i.e. just above the roof structural sheathing.
 - b. For wood shingles and shakes: a minimum continuous 1/4-inch vented air space separates the shingles/shakes and the roofing felt placed over the structural sheathing.
4. In zones 3 through 8 as defined in N1101.2 sufficient insulation is installed to maintain the monthly average temperature of the condensing surface above 45°F. The condensing surface is defined as either the structural roof deck or the interior surface of an air-impermeable insulation applied in direct contact to the underside/interior of the structural roof deck. "Air-impermeable" is quantitatively defined by ASTM E 283. For calculation purposes, an interior temperature of 68°F is assumed. The exterior temperature is assumed to be the monthly average outside temperature.

Item 14.

N1101.2 Compliance. Compliance shall be demonstrated by either meeting the requirement of the *International Energy Conservation Code* or meeting the requirements of this chapter. Climate zones from Figure N1101.2 or Table N1101.2 shall be used in determining the applicable requirements from this chapter.

TABLE N1101.5
DEFAULT GLAZED FENESTRATION U-FACTORS
TABLE N1101.5(1)
U-FACTOR DEFAULT TABLE FOR WINDOWS,
GLAZED DOORS AND SKYLIGHTS

FRAME MATERIAL AND PRODUCT TYPE*	SINGLE GLAZED	DOUBLE GLAZED
<u>Metal without thermal break:</u>		
Curtain wall	1.22	0.79
Fixed	1.13	0.69
Garden window	2.60	1.81
Operable (including sliding and swinging glass doors)	1.27	0.87
Site-assembled sloped/overhead glazing	1.36	0.82
Skylight	1.98	1.31
<u>Metal with thermal break:</u>		
Curtain wall	1.11	0.68
Fixed	1.07	0.63
Operable (including sliding and swinging glass doors)	1.08	0.65
Site-assembled sloped/overhead glazing	1.25	0.70
Skylight	1.89	1.11
<u>Reinforced vinyl/metal clad wood:</u>		
Fixed	0.98	0.56
Operable (including sliding and swinging glass doors)	0.90	0.57
Skylight	1.75	1.05
<u>Wood/vinyl/fiberglass:</u>		
Fixed	0.98	0.56
Garden window	2.31	1.61
Operable (including sliding and swinging glass doors)	0.89	0.55
Skylight	1.47	0.84

a. Glass-block assemblies with mortar but without reinforcing or framing shall have a U-factor of 0.60.

TABLE N1101.5(2)
SHGC DEFAULT TABLE FOR DENESTRATION

PRODUCT DESCRIPTION	SINGLE GLAZED				DOUBLE GLAZED			
	<u>Clear</u>	<u>Bronze</u>	<u>Green</u>	<u>Gray</u>	<u>Clear ± Clear</u>	<u>Bronze ± Clear</u>	<u>Green ± Clear</u>	<u>Gray ± Clear</u>
<u>Metal frames</u>								
Fixed	0.78	0.67	0.67	0.64	0.68	0.57	0.55	0.54
Operable	0.75	0.64	0.62	0.61	0.66	0.55	0.53	0.52
<u>Nonmetal frames</u>								
Fixed	0.75	0.64	0.62	0.61	0.66	0.54	0.53	0.52
Operable	0.63	0.54	0.53	0.52	0.55	0.46	0.45	0.44

N1101.6 Installation. All materials, systems and equipment shall be installed in accordance with the manufacturer's installation instructions and the conditions of any listing or required certifications Section R703.11.

N1101.6.1 Protection of exposed foundation insulation. Insulation applied to the exterior of foundation basement walls, crawl space walls, and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective

N1101.5 Fenestration product rating. U-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled U-factor shall be assigned a default U-factor from Table N1101.5. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Products lacking such a labeled SHGC shall be assigned a default SHGC of 0.75 for single pane and 0.65 for double pane and glazed block from Table 1101.5(2).

covering shall cover the exposed exterior insulation and extend a minimum of 6 inches (153 mm) below grade.

N1101.8 Certificate. A permanent certificate shall be posted inside the building on 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, where requirements apply, 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.

N1102.1 Insulation and fenestration criteria. The building thermal envelope shall meet the requirements of Table N1102.1 based on the climate zone specified in Table N1102.1 ~~N1102.1~~ N1101.2.

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:

- U-factor of 0.17 in Climate Zone 1.
- U-factor of 0.14 in Climate Zone 2
- U-factor of 0.12 in Climate Zone 3

N1102.2.3 Mass walls. Mass walls for the purposes this chapter shall be considered 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% 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:

- R-value of 4 in Climate Zone 1
- R-value of 6 in Climate Zone 2
- R-value of 8 in Climate Zone 3

N1102.5 Moisture control. The building design shall not create conditions of accelerated deterioration from moisture condensation. Above grade Frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.

Exceptions:

- In construction where moisture or its freezing will not damage the materials.
- Frame walls, floors and ceilings in jurisdictions in Zones 1 through 5 ~~4~~. (Crawl space floor vapor retarders are not exempted.)
- Where other approved means to avoid condensation are provided.

N1103.2.1 Insulation. Supply and return ducts shall be insulated to a minimum of R-8. Ducts in floor trusses shall be insulated to a minimum of R-6.

Exception: Ducts or portions thereof located completely inside the building thermal envelope ~~or within the building thermal envelope and separated from the exterior of the building thermal envelope with at least R-8 insulation.~~

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**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	Floor R-Value	Basement ^(c) Wall R-Value	Slab ^(d) R-Value & Depth	Crawl Space ^(e) Wall R-Value
1	1.20	1.60	0.40	30	13	6 3	13	0	0	0
2	0.80	1.05	0.40	30	13	6 4	13	0	0	0
3	0.60 0.65	0.90	0.40 ^(e)	30	13	6 5	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	8 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	25 ^(h)	10 / 13	10, 2 ft	10 / 13
6	0.35	0.60	NR	49	19 or 13+5 ^(g)	15	30 ^(h)	10 / 13	10, 4 ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	24 19	30 ^(h)	15 / 21	15, 4 ft	10 / 13

(No modification to table notes)

**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	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
1	1.20	1.60	0.035	0.082	0.440 0.197	0.064	0.360	0.477
2	0.80	1.05	0.035	0.082	0.440 0.165	0.064	0.360	0.477
3	0.60	0.90	0.035	0.082	0.440 0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.099 0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.037	0.059	0.065
6	0.35	0.60	0.026	0.060	0.077 0.059	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057 0.053	0.033	0.041	0.057 0.065

(a) Non-fenestration U-factors shall be obtained from measurement, calculation or an approved source.

**TABLE N1102.1.4
HVAC SYSTEM TRADEOFFS**

Climate Zone(s)	Required Improvement for HVAC System	Allowed Alternatives for Insulation/Fenestration ¹
2	SEER 13 OR Ducts & HVAC in conditioned space OR Ground source heat pump	Any fenestration U-factor
3	SEER 13 with AFUE 90 OR SEER 13 with HSPF 7.9 OR Ducts & HVAC in conditioned space OR Ground source heat pump	Double pane window with any U-factor
4 or 5	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-0 unconditioned basement R-0 slab R-19 floor
5	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-13 wall R-19 floor
6	SEER 12 with AFUE 92 OR SEER 12 with HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-38 ceiling Rf13 wall
7	AFUE 92 OR HSPF 8.2 OR Ducts & HVAC in conditioned space OR Ground source heat pump	R-38 ceiling R-15 wall

Notes:

1. Table N1102.1 requirements not stated remain the same. All footnotes of Table N1102.1 apply.
 2. After the year 2006 the SEER shall be increased by 2 from the value in this table; HSPF shall increase from 7.9 to 8.5 and from 8.2 to 8.8.
 3. In zones 3 through 8 dwelling units with electric resistance heating are not eligible to use this table.
 4. "Ducts & HVAC in conditioned space" includes air-handler and furnace being in conditioned space. ~~Factory sealed air handlers tested, listed and labeled by the manufacturer as having a 2% or less leakage rate at 1.0 inch water gauge shall meet the requirement for air handler being in conditioned space.~~
 5. For the uninsulated unconditioned basements trade off in Zones 4 and 5, at most one foot of the basement wall can be above grade. Any combination of the foundation insulation specified shall be permitted.
 6. Slabs with uninsulated hot water pipes, uninsulated air distribution ducts or electric heating cables installed within or under the slab are not eligible for this tradeoff of slab-edge insulation.
 7. ~~Evaporative cooling shall meet the SEER requirement if code official has deemed evaporative cooling appropriate to the climate of the jurisdiction.~~
 8. ~~Marine zone residences without mechanical air conditioning shall be exempt from the SEER requirement in this table.~~
- (Renumber table notes)

(Remainder of submittal as proposed)

Committee Reason: Based on proponent's published reason. The modifications by DOE was made to make minor technical and typographical corrections.

The modification by Julie Ruth was made to retain the current default U-factors table, remove vague language in N1101.6 and increase the maximum U-factor for Climate Zone 3.

The modification by Steve Skalko was made to recognize thermal mass credits that are presently in the IRC and to modify the thermal mass credit permitted by the calculation procedure DOE used.

Assembly Action: **None**

**Item 17 (IRC item by IRC Mechanical Committee
Committee Action: Approved as Modified**

Modify proposal as follows:

M1303.1 Label information. (No change to current text)

1. through 4. (No change to current text)
5. Maintenance instructions. Required regular maintenance actions; and Title or publication number for the operation and maintenance manual for that particular model and type of product.
6. ~~Equipment efficiency. Equipment efficiency for heating, cooling and service water heating equipment with equipment efficiency regulated as an AFUE, HSPF, SEER or EF.~~

Exception: Equipment assembled in the field.

Committee Reason: Adding maintenance instructions to the label will insure that such information will be available to the building owner and maintenance personnel in the future. The modification deletes the equipment efficiency requirements which the proponent stated are in conflict with FTC requirements.

Assembly Action: **None**

EC49-03/04

Committee Action: **Disapproved**

Committee Reason: The code has established one prescriptive compliance path per zone. To add additional alternates could lead to a large and confusing number of paths which would have very limited variations and application. If the existing path is not acceptable, one of the other compliance methods such as Chapter 4, RESCheck or the performance path which would permit this could be used. This action is also consistent with the action taken on EC26 which is similar but is based on the current IECC instead of the EC48 proposal as this item is.

Assembly Action: **None**

EC50-03/04

Committee Action: **Approved as Submitted**

Committee Reason: Eliminates an exclusion which is placed into the code by the committee's action on EC48. To trade off energy requirements when impact resistant glazing is required would greatly increase the energy usage in these coastal areas. Such a reduction would not be justified especially in situations where shutters or plywood covers were used to comply with the impact provisions. This proposal would essentially leave the IECC as it currently is because the U-factor requirements are applicable in these coastal areas under the 2003 edition. The committee also supported removing the exclusion because there are several manufacturer's with products currently available and it is assumed that additional manufacturers will have products on the market by the time the 2006 code is issued.

Assembly Action: **None**

EC51-03/04 **Withdrawn by Proponent**

EC52-03/04

Committee Action: **Disapproved**

Committee Reason: The proposal would offer two options which would then permit "gaming" of cost versus the site energy determination. The dual provisions would then create an uneven field for comparison. Given this system, it would permit you to run the comparison two ways and then allow the selection of the method which gives the most favorable results.

Assembly Action: **None**

EC53-03/04

Committee Action: **Approved as Modified**

Modify proposal as follows:

**TABLE 404.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND
PROPOSED DESIGNS**

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Glazing: ^a	Total area ^b = 18% of conditioned floor area	As proposed
	Orientation: equally distributed to four (4) cardinal compass orientations (N, E, S & W)	As proposed
	U-factor: from Table 402.1.2	As proposed
	SHGC: from Table 402.1.2 except that for climates with no requirement (NR) SHGC = 0.55 <u>0.40</u> shall be used	As proposed
	SHGC: 0.40 shall be used for all climates	As proposed
	Interior shade coefficient: Summer = 0.70 Winter = 0.85	Same as Standard Reference design ^c
External shading: none	As proposed	

(Remainder of table as proposed)

Committee Reason: This action is intended to be consistent with the action taken on EC11 which is similar but is based on the current IECC instead of the EC48 proposal as this item is. The intent of the modification is to maintain the reference back to the prescriptive requirements which are the baseline. That way if the baseline requirement changes this section would automatically be updated and stays consistent.

Assembly Action: **None**

EC54-03/04

Committee Action: **Approved as Submitted**

The proposal keeps the standards which are currently referenced by the IECC up to date. The committee did note that an editorial change was needed. The proper title for ARI Standard 550/590 is "Water Chilling Packages Using the Vapor Compression Cycle."

Assembly Action: **None**

EC55-03/04

Committee Action: **Disapproved**

Committee Reason: Based on the committee's actions on EC48-03/04

Assembly Action: **None**

