2019 ICC CODE DEVELOPMENT CYCLE UPDATES TO THE 2019 PROPOSED CHANGES TO THE INTERNATIONAL CODES

Update to the 2019 Group B – Consolidated Monograph Updates 3/26/2019

The first errata was posted on 3/26/2019, updated on 4/2/2019, 4/17/2019 and 8/20/2019.

2018-2019 Code Development Cycle, Group B (2019) Proposed Changes to the 2019 *International Codes*

Fourth Printing

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TABLE OF CONTENTS

Updated April 17, 2019

PAGE

2019 Committee Rosters

IADMIN 1
IECC – R 2
IgCC 3

2019 Hearing Orders

IADMIN 4
IEBC 5
IECC – C 6
IECC – R 8
IRC – B 10

2019 Proposed Changes

IADMIN 12
IBC – S 16
IEBC 18
IECC – C 20
IECC – R 92
IRC – B 103
CCC 130

2019 GROUP B – PROPOSED CHANGES TO THE ADMINISTRATIVE PROVISIONS CODE

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ADM47-19: This is the referenced standards administrative update code change intended to be heard as a single code change. This code change was set up to include all of the ICC codes in an effort to allow for easier review by code users. The hearing order incorrectly indicated each code as a separate item. The update below revises the order to indicate a single change.

TENTATIVE ORDER OF DISCUSSION
2019 PROPOSED CHANGES TO THE ADMINISTRATIVE PROVISIONS CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some ADM code change proposals may not be included on this list, as they are being heard by another committee.

ADM1-19 Part I
ADM2-19 Part I
ADM3-19 Part I
ADM4-19
ADM5-19 Part I
ADM6-19
ADM7-19
ADM8-19
ADM9-19 Part I
ADM10-19 Part I
ADM11-19
ADM12-19
ADM13-19
ADM14-19
ADM15-19
ADM16-19 Part I
ADM17-19
ADM18-19
ADM19-19
ADM20-19
ADM21-19
ADM22-19
ADM23-19 Part I
ADM24-19 Part I
ADM25-19
ADM26-19
ADM27-19
ADM28-19
ADM46-19 Part I
ADM29-19
ADM30-19
ADM31-19 Part I
ADM32-19 Part I
ADM33-19 Part I
ADM34-19
ADM35-19
ADM36-19
ADM37-19 Part I
ADM38-19 Part I
ADM39-19 Part I
ADM40-19 Part I
ADM41-19 Part I
ADM42-19
ADM43-19 Part I
ADM44-19
ADM45-19
ADM47-19 ~~IBC~~
~~ADM47-19 IFC~~
~~ADM47-19 IMC~~
~~ADM47-19 IPC~~
~~ADM47-19 IRC~~
~~ADM47-19 IEBC~~
~~ADM47-19 IFGC~~
~~ADM47-19 IPMC~~
~~ADM47-19 IPSDC~~
~~ADM47-19 ISPSC~~
~~ADM47-19 IWUIC~~
~~ADM47-19 IECC-C~~
~~ADM47-19 IECC-R~~

2019 PROPOSED CHANGES TO THE ADMINISTRATIVE PROVISIONS CODE

Updated April 2, 2019

ADM1-19 Part I & Part II: Added proponent to the code change

ADM1-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM9-19 Part through Part IV: Added proponent to the code change

ADM9-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Michael O'Brian, FCAC, representing FCAC (fcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM10-19 Part I through Part IV: Added proponent to the code change

ADM10-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM16-19 Part I through Part III: Added proponent to the code change

ADM16-19 Part III

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM31-19 Part I through Part III: Added proponent to the code change

ADM31-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM33-19 Part I through Part III: Added proponent to the code change. Corrected hearing committee banner

ADM33-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

THIS IS A 4 PART CODE CHANGE. PART I WILL BE HEARD BY THE ADMINISTRATIVE CODE COMMITTEE. PART II WILL BE HEARD BY THE ~~IRC-BUILDING~~ IECC-COMMERCIAL CODE COMMITTEE. PART III WILL BE HEARD BY THE IECC-~~COMMERCIAL~~ RESDIENTIAL CODE COMMITTEE. PART IV WILL BE HEARD BY THE IgCC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Updated April 2, 2019

ADM40-19 Part I through Part V: Added proponent to the code change

ADM40-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM41-19 Part I through Part IV: Added proponent to the code change

ADM41-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

Updated April 2, 2019

ADM43-19 Part I through Part IV: Added proponent to the code change

ADM43-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)

ADM45-19 (IBC): Item list 1-9 has been added

ADM45-19

Proponent: Ali Fattah, City of San Diego, representing City of San Diego (afattah@sandiego.gov)

O103.1 Qualifications. Listing Agencies issuing a product Listing, and Approved Sources issuing a Research Report, shall be accredited by an approved accreditation body as to competence and capability in compliance with Sections 1703.1.1 through 1703.1.3. Approved Product Listing or Approved Sources issuing product evaluation reports satisfy the following requirements:

1. Approved agencies shall be accredited by Accreditation by a body that is a signatory to the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) and is itself accredited to ISO/IEC Standard 17011, General Requirements for accreditation bodies accrediting conformity assessment bodies (CABs).
2. The agency shall employ qualified technical personal familiar with the *International Building Code* and the *International Fire Code* and their referenced standards as well as the evaluation criteria and standards used to produce the evaluation report.
3. Evaluation Reports shall be issued under the supervision of a licensed professional engineer.
4. The agencies shall implement a product labeling and identification program consistent with requirements for labeling in the code.
5. The agencies shall publish lists for evaluated or listed materials, assemblies or products.
6. The Agencies shall develop and implement quality control programs that shall be satisfied by the product evaluation and listing report holder and shall require follow up in-plant inspections to determine compliance with the approved quality control program.
7. The agencies shall publish Research Reports or listings based on, in order of importance, the code; or standards recognized in the codes, and when the product is an alternative material or system recognized under IBC Section 104.11, Acceptance Criteria that have been developed with public input and are acceptable to the Building Official.
8. The agencies shall have a process to periodically re-evaluate published product evaluation reports and product listing to address applicable changes in the applicable codes, acceptance criteria or referenced standards used in the evaluation report.
9. The Agencies shall develop and implement quality control programs that shall be satisfied by the product evaluation and listing report holder and shall require regular follow up in-plant inspections to verify compliance with the approved quality control program.

Updated August 20, 2019

ADM47-19 (IBC): Add the following standard change:

International Building Code:

NFPA	National Fire Protection Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
285 – ~~12~~ 19	Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components	IBC

Updated 4/17/2019

ADM47-19 (IBC): Standard is being removed from the code change:

ASCE	National Fire Protection Association	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~49 – 12~~	~~Wind Tunnel Testing for Buildings and Other Structures~~	~~IBC~~

ADM47-19 (IRC): Standard is being removed from the code change:

International Residential Code:

ASTM	ASTM International	
Standard Reference Number	**Title**	**Referenced in Code(s):**
~~C645 – 14~~	~~Specification for Nonstructural Steel Framing Members~~	~~IRC®~~

2019 PROPOSED CHANGES TO THE INTERNATIONAL BUILDING CODE (STRUCTURAL)

S194-19: Replace the proposal with the following:

S194-19

IBC®: 2510.6

Proponent: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing self (joe@buildingscience.com)

2018 International Building Code

Revise as follows:

2510.6 Water-resistive barriers. *Water-resistive barriers* shall be installed as required in Section 1403.2 and, where applied over wood-based sheathing, shall include a water-resistive ~~vapor-permeable~~ barrier with a ~~performance~~ water resistance at least equivalent to two layers of *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing (installed in accordance with Section 1404.4) intended to drain to the *water-resistive barrier* is directed between the layers.

Exceptions:

1. Where the water-resistive barrier that is applied over wood-based sheathing has a water resistance equal to or greater than that of a water-resistive barrier complying with ASTM E2556 ~~,~~ Type ~~II~~ I and is separated from the stucco by an intervening , ~~substantially nonwater-absorbing layer or drainage~~ foam plastic insulating sheathing layer or by a minimum 3/16 inch (4.8 mm) space.
2. Where the *water-resistive barrier* is applied over wood-based sheathing ~~in Climate Zone 1A, 2A or 3A, a ventilated air~~ and where the annual mean rainfall as determined from approved weather data exceeds 20 inches (508 mm), a minimum 3/16 inch (4.8 mm) space shall be provided between the stucco and *water-resistive barrier*.

Reason:
Objective:

1. Define water resistance as the primary functional requirement of the WRB and remove reference to vapor permeable.
2. Enable a single layer of WRB complying with ASTM E2556 Type 1 with a drainage space.
3. Define depth drainage space.

The existing code language gives insufficient guidance for other approved materials. The added language addresses this issue and provides a specific performance requirement for water resistance and provides consistency with other sections of the code that relate specifically to water resistive barriers.

The size of the drainage space needs to be specified. Type 1 is the appropriate water-resistive metric for the specified space. This logic is consistent with the body and intent of the text of Section

2510.6. The specified space and one layer of Type 1 provides equivalent performance to the two layers of Type 1 specified in the body of 2510.6.
Annual mean rainfall is the appropriate metric for risk not humidity.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change gives better guidance for water-resistance.

Updated 4/17/2019

Add EB73-19 after EB65-19

TENTATIVE ORDER OF DISCUSSION 2019 PROPOSED CHANGES TO THE INTERNATIONAL EXISTING BUILDING CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some EB code change proposals may not be included on this list, as they are being heard by another committee.

EB4-19
EB9-19
EB10-19
EB11-19
EB12-19
EB13-19
EB17-19
    EB5-19
    EB8-19
EB19-19
EB20-19
EB21-19
EB22-19
EB23-19
EB24-19
EB25-19
EB26-19
EB27-19
EB28-19
EB29-19
EB30-19
EB31-19
EB33-19
EB34-19
EB35-19
    EB32-19
EB36-19
EB37-19
EB38-19
EB39-19
EB40-19
    EB6-19
    EB7-19
EB41-19
EB42-19
EB46-19
EB47-19
EB48-19
    EB118-19
    EB134-19
EB49-19
EB50-19
EB51-19
EB52-19
EB59-19
EB60-19
EB61-19
EB62 -19
EB63-19 Part I
EB64-19
EB65-19
    EB73-19
EB70-19
    EB3-19
    EB1-19
EB71-19
EB72-19
EB74-19
EB77-19
EB78-19
EB79-19
EB80-19
EB81-19
EB82-19
EB83-19
EB84-19
EB85-19
    EB93-19
EB86-19
EB87-19
EB88-19
EB89-19
EB90-19
EB91-19
EB92-19
EB94-19
EB95-19
EB96-19
EB97-19
EB98-19
EB99-19
EB100-19
EB101-19 Part I
EB102-19
EB103-19
EB104-19
    EB14-19
EB105-19
EB106-19
EB107-19
EB108-19
EB109-19
EB110-19
EB111-19
EB112-19
EB113-19
EB114-19
EB115-19
EB116-19
EB117-19
EB119-19
EB120-19
EB121-19
EB122-19
EB123-19
EB124-19
EB125-19
EB126-19
EB127-19
EB128-19
EB129-19
EB130-19
EB131-19
EB132-19
EB133-19

2019 PROPOSED CHANGES TO THE INTERNATIONAL EXISTING BUILDING CODE

Updated April 17, 2019

EB60: Added proponent to the code change

EB60-19

Proponent: John Williams, representing Healthcare Committee (AHC@iccsafe.org); Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

Updated April 17, 2019

EB61: Added proponent to the code change

EB61-19

Proponent: John Williams, representing Healthcare Committee (AHC@iccsafe.org); Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

EB144-19: Correction made to Item #2

EB144-19

Proponent: David Bonowitz, representing Self (dbonowitz@att.net)

THIS CODE CHANGE WILL BE HEARD BY THE IBC STRUCTURAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THIS COMMITTEE.

Delete without substitution:

[BS] A205.2 Alterations and repairs. ~~*Alterations* and *repairs* required to meet the provisions of this chapter shall comply with applicable structural requirements of the building code unless specifically modified in this chapter.~~

Revise as follows:

[BS] A205.3 Requirements for plans. The plans shall accurately reflect the results of the engineering investigation and design and shall show all pertinent dimensions and sizes for plan review and construction. The following shall be provided:

1. Floor plans and roof plans shall show existing framing construction, diaphragm construction, proposed wall anchors, cross-ties and collectors. Existing nailing, anchors, cross-ties and collectors shall be shown on the plans if they are considered part of the lateral force-resisting systems.

2. ~~At elevations where there are *alterations* or damage, details shall show roof and floor heights, dimensions of openings, location and extent of existing damage and proposed *repair*.~~
3. Typical wall panel details and sections with panel thickness, height, pilasters and location of anchors shall be provided.
4. Details shall include existing and new anchors and the method of developing anchor forces into the diaphragm framing, existing and new cross-ties, and existing and new or improved support of roof and floor girders at pilasters or walls.

Updated April 17, 2019

CE119-19: Should only display once, there is no Part I.
CE154-19: Withdrawn by Proponent
CE155-19: Remove from this hearing order
CE195-19: Withdrawn
CE266-19: There is no CE266-19 code change
CE267-19: There is no CE267-19 code change

TENTATIVE ORDER OF DISCUSSION 2019 PROPOSED CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE – COMMERCIAL

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

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CE1-19 Part I
CE2-19
CE3-19 Part I
CE4-19 Part I
CE5-19 Part I
CE6-19 Part I
CE7-19 Part I
ADM9-19 Part II
ADM10-19 Part III
CE8-19 Part I
CE9-19 Part I
CE10-19 Part I
CE11-19 Part I
ADM46-19 Part lll
CE12-19 Part I
CE13-19 Part I
CE14-19
CE15-19 Part I
ADM33-19 Part II
CE16-19 Part I
ADM31-19 Part II
CE17-19 Part I
ADM41-19 Part III
ADM40-19 Part III
CE18-19 Part 1
CE20-19 Part I
CE19-19 Part I
CE21-19
ADM1-19 Part II
ADM2-19 Part II
ADM3-19 Part II
CE23-19 Part I
CE24-19
CE25-19
CE22-19 Part I
CE26-19
CE27-19
CE29-19 Part I
CE30-19 Part I
CE31-19 Part I
CE28-19 Part I
CE32-19 Part I
CE33-19
CE34-19 Part I
CE35-19
CE36-19 Part 1
CE37-19 Part I
CE38-19
CE40-19 part I
CE41-19
CE42-19 Part I
CE43-19
CE44-19
CE45-19
CE46-19
CE47-19
CE48-19
CE49-19
CE50-19
CE51-19 Part I
CE52-19
CE53-19
CE54-19 Part I
CE55-19
CE56-19
CE57-19
CE58-19
CE59-19
CE60-19 Part I
CE61-19
CE62-19 Part I
CE63-19
CE64-19
CE65-19
CE66-19
CE67-19
CE68-19
CE69-19
CE70-19
CE71-19
CE72-19
CE73-19
CE74-19
CE75-19
CE76-19
CE77-19
CE78-19 Part I
CE79-19
CE80-19
CE81-19
CE82-19
CE83-19
CE84-19
CE85-19
CE86-19
CE87-19
CE88-19
CE39-19
CE89-19
CE90-19
CE91-19
CE92-19
CE93-19 Part I
CE94-19
CE95-19
CE96-19
CE97-19
CE98-19
CE99-19
CE100-19
CE101-19
CE102-19
CE103-19 Part I
CE104-19
CE105-19
CE106-19

CE107-19
CE108-19
CE109-19
CE110-19
CE111-19
CE112-19
CE113-19
CE114-19
CE115-19 Part I
CE116-19 Part I
CE117-19
CE118-19
~~CE119-19 Part I~~
CE119-19
CE120-19
CE121-19
CE122-19
CE123-19
CE124-19
CE125-19
CE126-19
CE127-19
CE128-19
CE129-19
CE130-19
CE131-19
CE132-19
CE133-19
CE134-19
CE135-19
CE136-19
CE137-19
CE138-19
CE139-19
CE140-19
CE141-19
CE142-19
CE143-19
CE144-19
CE145-19
CE146-19
CE147-19
CE148-19
CE149-19
CE150-19 Part I
CE151-19 Part I
CE152-19
P1-19
CE153-19
~~CE154-19~~
~~CE155-19~~
CE156-19
CE157-19
CE158-19
CE159-19 Part I
CE160-19
CE161-19
CE162-19
CE163-19
CE164-19
CE165-19
CE166-19
CE167-19
CE168-19
CE169-19
CE170-19
CE171-19
CE172-19
CE173-19
CE174-19
CE175-19
CE176-19
CE177-19
CE178-19
CE179-19
CE180-19
CE181-19
CE182-19
CE183-19
CE184-19
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CE197-19
CE198-19
CE199-19
CE200-19
CE201-19
CE202-19
CE203-19
CE204-19
CE205-19
CE206-19
CE207-19
CE208-19
CE209-19
CE210-19
CE211-19
CE212-19
CE213-19
CE214-19
CE215-19
CE216-19
CE217-19 Part I
CE218-19
CE219-19
CE220-19
CE221-19
CE222-19
CE223-19
CE224-19
CE225-19
CE226-19
CE227-19
CE228-19
CE229-19
CE230-19
CE231-19
CE232-19
CE233-19
CE234-19
CE235-19
CE236-19
CE237-19
CE238-19
CE239-19
CE240-19
CE241-19
CE242-19
CE243-19
CE244-19
CE245-19
CE246-19
CE247-19
CE248-19 Part I
CE249-19
CE250-19
CE251-19
CE252-19
CE253-19 Part I
CE254-19
CE255-19 Part I
CE256-19
CE257-19
CE258-19
CE259-19
CE260-19
CE261-19
ADM43-19 Part III
CE263-19 Part I
CE264-19
CE262-19
CE265
~~CE266~~
~~CE267~~

2019 PROPOSED CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE (COMMERCIAL)

CE1-19: Corrected reason statement for Part I & Part II.

CE1-19

Proponent: Darren Meyers, P.E., International Energy Conservation Consultants LLC, representing Self (dmeyers@ieccode.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason: There are areas outside of the commercial and residential buildings where energy savings is possible by applying provisions currently in the IECC. Examples include lighting in parking lots that may or may not be directly associated with a commercial or residential building or lighting and equipment associated with industrial or physical plants, public or private parks and public or private campus environments. Imagine the additional and credible energy savings that could be acquired by expanding the scope and application of the IECC, as such.

This proposal expands the scope and application of the commercial provisions of the IECC to apply to energy-using systems in areas outside of the building itself. The proposal revises an existing term "BUILDING SITE' and introduces term, “STRUCTURE” utilized throughout the ICC Family of International Codes, to define those types of environments where the building may not enclose the extent of energy-using lighting, motor, pumping and vertical transportation systems and equipment addressed in the code as currently constituted. Also, a new provision is included in both Chapter 4 [CE] and Chapter 4 [RE] “Application” to address structures and sites with or without buildings.

CE7-19: Corrected reason statement and documentation for Part I & Part II

CE7-19

Proponent: Steven Rosenstock, Edison Electric Institute, representing Edison Electric Institute (srosenstock@eei.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:
Part I: This proposal updates the intent to account for what is happening at commercial buildings in many parts of the US.

In Section C406.1, one of the options to comply with the "additional efficiency package options" is to add an on-site renewable energy **production** system in accordance with Section C406.5. Renewable energy production systems such as PV panels are a form of energy production, not energy conservation. As a result, the code is now starting to regulate energy production,

since there is a minimum requirement in C406.5, and this change should be reflected in the intent of the code.

Also, the growth of energy storage systems, both on the grid side as well as the customer side of the meter, is increasing rapidly. Energy storage systems can be used to help with on-site renewable energy production systems, grid-based renewable energy production systems, or both.

Utilities are now offering commercial customers incentives for installing energy storage systems.

Here are links to 2 examples:
https://www.coned.com/en/save-money/rebates-incentives-tax-credits/rebates-incentives-tax-credits-for-commercial-industrial-buildings-customers/demand-management-incentives (for Con Edison in New York)
https://energycenter.org/sgip/incentives (for SDG&E in California)
As more buildings install renewable energy production systems and energy storage systems, code officials will need to be familiar with the requirements and enforce code requirements.

Part II: This proposal updates the intent to show that the IECC is now starting to regulate energy production and energy storage systems that are installed in new homes. This update is needed to account for trends in certain areas of the US.

For example, Appendix RB contains requirements for solar-ready provisions installed on single-family homes and townhouses. In Section 406, the Energy Rating Index Compliance Alternative, renewable energy production can be used to obtain a better score. Therefore, the code is now starting to regulate renewable energy production systems that are installed in residential facilities. Renewable energy systems are a form of energy production, not building energy use. The production of renewable energy does not conserve the amount of energy a building or end-use system or appliance will use. The intent of the code should be updated to account for the recent code changes.

In addition, in California's Title 24, PV energy production systems are now required on new homes (with some exceptions). One of the options with this mandate is to include an on-site energy storage system in the home, as shown below:
From CA Title 24-2019:
"PV sizes from Equation 150.1-C may be reduced by 25 percent if installed in conjunction with a battery storage system. The battery storage system shall meet the qualification requirements specified in Joint Appendix JA12 and have a minimum capacity of 7.5 kWh."

Therefore, code officials will be enforcing the installation of on-site renewable energy production systems, along with the installation of on-site energy storage systems in some cases. This will in addition to enforcing the energy conservation requirements of the energy code.

Bibliography:
Part I:
US DOE Better Buildings Program, *On-Site Energy Storage Decision Guide*, April 2017
https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/BB%20Energy%20Storage%20Guide.pdf
Part II:
California Energy Commission, "*2019 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS*", December 2018
https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

CE12-19: Corrected reason statement for Part I & Part II

CE12-19

Proponent: Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Reason:
Part I: The purpose of this code change proposal is to establish a reasonable level of efficiency for the permanent thermal envelope in buildings constructed to "above code" programs. The IECC already requires that buildings constructed to the standards of an above-code program demonstrate compliance with the "mandatory" measures of the IECC; this proposal applies a minimum thermal envelope backstop similar to the one that applies to the Energy Rating Index in residential section R406.

We have followed the approach of section R406 to use the 2009 IECC as a backstop, but we would also support referencing the 2012 IECC. As the IECC improves in efficiency, so also should the backstops and consumer protection provisions of the code.

Part II: The purpose of this code change proposal is to establish a reasonable level of efficiency for the permanent thermal envelope in buildings constructed to "above code" programs. The IECC already requires that buildings constructed to the standards of an above-code program demonstrate compliance with the "mandatory" measures of the IECC; this proposal applies a minimum thermal envelope backstop similar to the one that applies to the Energy Rating Index in Section R406. If a minimum backstop is necessary for the ERI, it stands to reason that a minimum backstop would be even more valuable in an even less fully defined and potentially less rigorous "above code" program. We have proposed the 2009 IECC in this proposal to maintain consistency with the current section R406, but we would also support referencing the 2012 IECC. (We have proposed updating the Section R406 backstop to the 2012 IECC in a separate proposal because we believe that as the IECC improves in efficiency, so also should the backstops and consumer protection provisions of the code.)

CE21-19: Reason statement has been updated

CE21-19

Proponent: jim edelson, representing New Buildings Institute (jim@newbuildings.org)

Reason: The existing definition in IECC dates to the 2012 IECC. It was proposed by the team of New Buildings Institute, US Depatment of Energy and American Institute of Architects. It was one clause in a comprehensive overhaul of the 2009 IECC. When it was written in 2010, it was the first time that renewable energy had been defined in an I-code, and it reflected a very early understanding of a much less mature industry. It has not been significantly revised since.
This proposal does indeed update the language by further refining biomass energy sources with terms that were not available at the time it was drafted in 2010. Revised language makes the proper distinction between geothermal energy sources and geothermal heat pumps. The revison also limits the biomass sources to those that meet specifications as waste products. There are many flavors of biomass energy, but this proposal ensures that virgin material of unknown origin is not used as a steady source of energy, which in the provisions of C406 is a trade-off for energy efficency features of the building. The definitions of *biomass gas* and *biomass waste* are taken from the glossary of the Energy Information Administration.

This proposal does not restrict the geographic sourcing of the waste material, but it does ensure that the system converting the fuel is located on the building site.

This proposal impacts and clarifies only the "landfill gas, biogas and biomass" terms in the on-site renewable definition. It is independent of another proposal to restructure and revise other terms in the same definition.

CE23-19: Reason statement and documentation for Part I & Part II

CE23-19

Proponent: Robby Schwarz, EnergyLogic, representing EnergyLogic (robby@nrglogic.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason: Section C407.4.1 of the Total building performance approach, Section R402.1.5 total UA Alternative compliance report, Section R405 Simulated Performance cost compliance report, and Section R406 Energy Rating Index compliance reports are required to be generated and turned into the jurisdiction having authority in order to obtain a building permit and in some cases to obtain the certificate of occupancy. However, there is no definition of what these reports are in relationship to Construction Documents. A variety of building professionals such as Builders, Insulators, HVAC Contractors, Raters and others create these Compliance Documents yet the IECC is vague as to whether they are actually allowed to do so. The IECC references that registered design professionals must generate construction documents and technical reports in Section R103.1, which leaves ambiguity regarding less technical reports that are created from the information that may be included in the construction documents and or more technical reports. As registered design professionals are not required to create required compliance reports or use RESCheck or Rating software's, and their expertise often does not fall within the purview of compliance documentation it makes sense to clearly define the report so that it is also clear that others professionals are allowed to create them. This definition in conjunction with current language in Section R103.1 will ensure that the authority having jurisdiction, registered design professionals, and those creating compliance documents all clearly understand their responsibilities.

Cost Impact: The code change proposal will decrease the cost of construction
This proposal will save builders money by ensuring that registered design professionals are not required to generate compliance reports that are needed to obtain the building permit and certificate of occupancy. The market has determined that more cost effective solutions are available.

CE29-19 Part I: Committee hearing banner added

CE29-19 Part I

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

CE30-19: Reason statement and documentation for Part I & Part II

CE30-19

Proponent: Hope Medina, representing Self (hmedina@coloradocode.net)

Reason:
This definition will assist with the distinction between a remodel and a first time tenant finish.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
New definition

CE31-19: Corrected reason statement and documentation for Part I & Part II

CE31-19

Proponent: jim edelson, New Buildings Institute, representing New Buildings Institute (jim@newbuildings.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:

Part I: The existing definition in IECC dates to the 2012 IECC. It was proposed by the team of New Buildings Institute, US Department of Energy and American Institute of Architects. It was one clause in a comprehensive overhaul of the 2009 IECC. When it was written in 2010, it was the first time that renewable energy had been defined in an I-code, and it reflected a very early understanding of a much less mature industry. It has not been revised significantly since.

This proposal does indeed update the language. It reflects both the existing IECC language, and a modified version of the language that has been deliberated by a diverse working group for over 6 months at ASRAE, and is pending (as of the time of submittal) at ASHRAE 90.1. The definition language reflects a better understanding of the shape and character of renewable energy sources. It disconnects the actual energy sources from the definition of on-site so those can be modified independently if necessary in future editions. The proposal also describes "hot fluid or steam heated within the earth" to make the distinction between geothermal energy sources and geothermal heat humps. Since 90.1 is referenced as a compliance path in IECC, this revision will establish consistency between the two documents, and simplify compliance and enforcement of onsite renewable energy going forward.

The proposal, when adopted, allows for the correct italicizing of "on-site renewable energy" in Section C406.5 and wherever these definitions are used.

Part II: There has been a definition of "onsite renewable energy" since 2012 in the commercial IECC. The term was first used in the IECC residential code in 2018, but no definition was included at that time. This proposal adds an updated version of that definition that is simultaneously being proposed for the commercial IECC. Some of the modifications are based on language that has been deliberated by an ASHRAE workgroup for over six months and is pending at ASHRAE 90.1 (at the time of this submittal). This proposal could establish consistency between IECC-residential, IECC-commercial, and ASHRAE 90.1, thereby simplifying compliance and enforcement for onsite renewable energy installations.

The listed energy resources in the definition are similar to those found in the current IECC definition with the exception of "extracted from hot fluid or steam heated within the earth". That

proposed revision from the current definition makes the distinction between geothermal energy sources and geothermal heat pumps.

When these are accepted as definitions into this portion of the code, staff will be able to italicize the use of the terms such as in the definitions and the Footnote a to Table R406.4.

Bibliography:

Addendum *by* to Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings; ASHRAE, January 2018. (pending at the time of submittal)

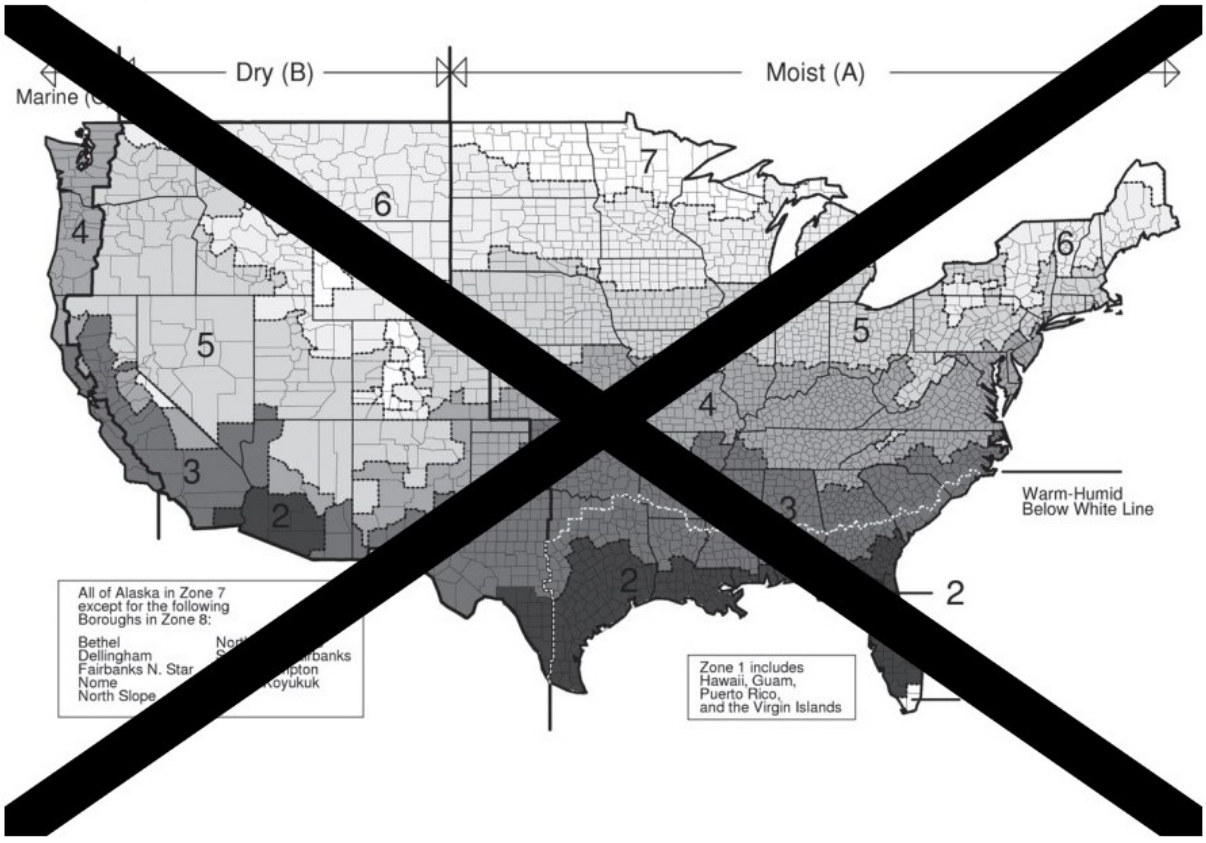
Cost Impact: The code change proposal will not increase or decrease the cost of construction This proposal is a definition of renewable energy that will not have an impact on construction costs. The modification of the definition only applies to the fuel used in the building after occupancy.

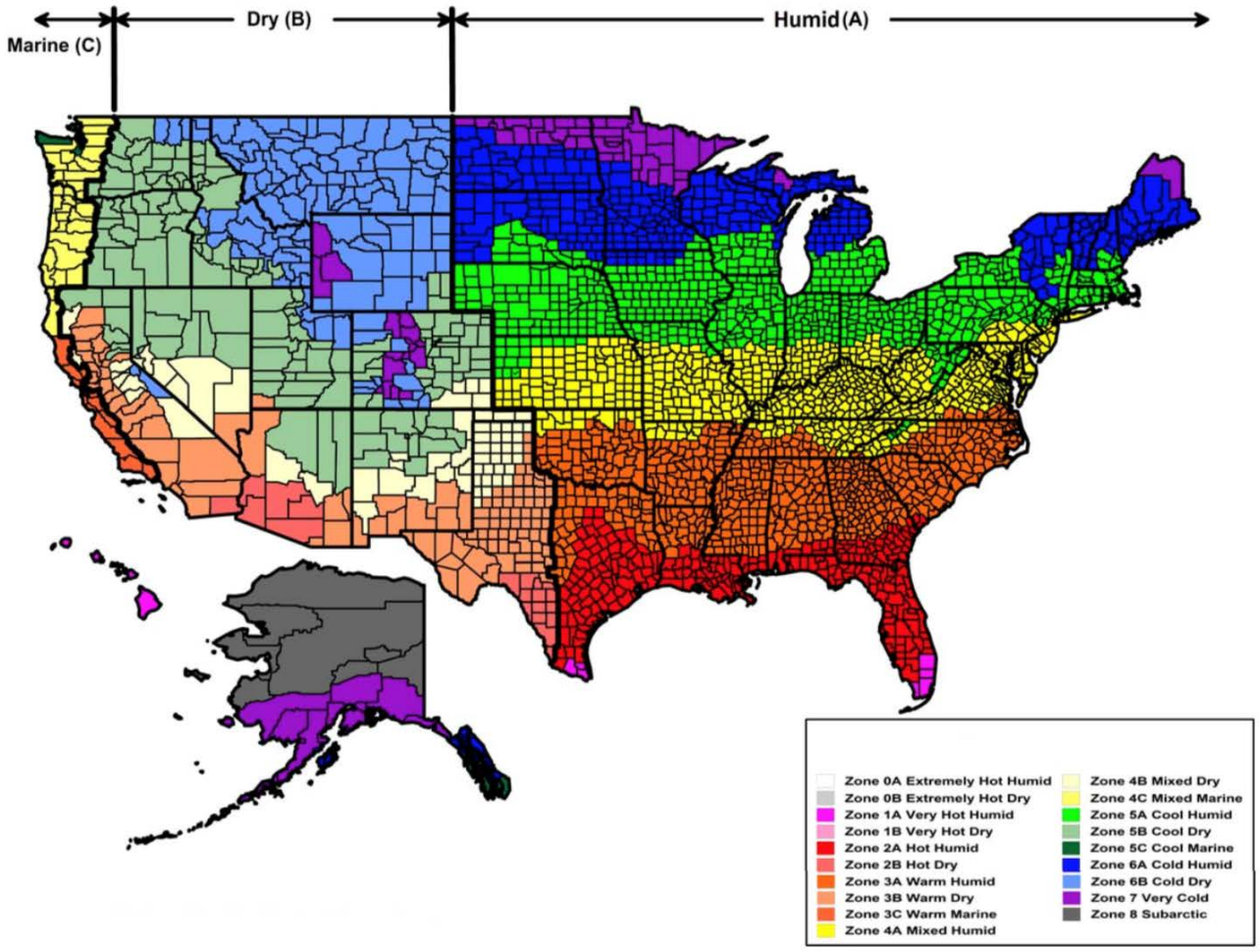
CE36-19: Existing Figure R301.1 did not appear struck out

CE36-19

Proponent: jim edelson, New Buildings Institute, representing New Buildings Institute (jim@newbuildings.org)

Revise as follows:





Updated 4/17/2019

CE38-19: Reason is reproduced to include the image.

CE38-19

IECC: R405.3

Proponent: Kurt Roeper, representing Steel Door Institute (kurt.roeper@assaabloy.com)

Reason: The existing default values are not reflective of product performance data. The proposed default values are worst case values derived from testing 26 specimens manufactured by 11 unique steel door manufacturers. A certified test report from an accredited, independent laboratory is appended to this proposal. Testing was conducted in accordance with:

ASTM C1199-09 Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods

ASTM C1365 – 05 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

ASTM E1423 – 06 Standard Practice for Determining Steady State Thermal Transmittance of Fenestration Systems

Section 303.1.3 unchanged – see table C303.1.3(2) for proposed change to default values

Table C303.1.3(1) – unchanged

intertek
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December 14, 2018

Steel Door Institute
Mr. Jeff Wherry
30200 Detroit Road
Westlake, Ohio 44145

RE: U-Value Summary

Dear Mr. Wherry,

Pursuant to your recent request this letter will summarize the thermal testing conducted for the Steel Door Institute (SDI) on hollow metal steel doors and frames. All testing was conducted by Intertek, Mississaugua, Canada, a Standards Council of Canada accredited test facility, on dates June, 2010 – May, 2011 as reported in Test Report #G100020717TOR dated June 13, 2011 and revised on June 5, 2012.

Testing was conducted in accordance with:

ASTM C1199-09, *Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods.*

ASTM C1365-05, *Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.*

ASTM E1423-06, *Standard Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.*

All testing was conducted using the following components:

Door Assembly	Model
Panels	16 ga & 18 ga steel with extruded polystyrene (insulated core) or honeycomb (non-insulated core)
Frame	Generic – non-thermally broken steel
Hinges	Generic – 4.5" steel
Door Latch	Generic – steel knob
Sill Sweep	Generic – vinyl with co-extruded bulb and fins

Insulated Panel Doors

Twenty-one (21) doors, submitted from eleven (11) SDI member companies, with extruded polystyrene cores were thermally tested with the following results:

Highest U-value	0.42 Btu/hr·ft^2·F
Lowest U-value	0.37 Btu/hr·ft^2·F
Average U-value	0.39 Btu/hr·ft^2·F
Median U-value	0.39 Btu/hr·ft^2·F

Non-insulated Panel Doors

Five (5) doors, submitted from five (5) SDI member companies, with honeycomb cores were thermally tested with the following results:

Highest U-value	0.60 Btu/hr·ft^2·F
Lowest U-value	0.55 Btu/hr·ft^2·F
Average U-value	0.55 Btu/hr·ft^2·F
Median U-value	0.56 Btu/hr·ft^2·F

This information summarizes the testing and performance achieved and to be expected from products with similar constructions. Please contact us if you have any questions or if we can be of further assistance.

Yours sincerely,

Digitally Signed by: Daniel A. Johnson

Daniel A. Johnson
Director – Regional Operations

cc: I9824.01-201-17

CE42-19

Proponent: David Collins, SEHPCAC, representing SEHPCAC (SEHPCAC@iccsafe.org); David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason: No technical changes are intended. No advantage to any proprietary interests governed by the code is intended. The intent is strictly to make the IECC more understandable and easier to use, as explained below.

Part I: The labels “prescriptive” and “mandatory” are found in the IECC but they are not used consistently and no direction is provided for the intended application of the provisions with such labels. These terms are applied to various section and subsection titles throughout the IECC creating confusion for users of the code. The SEHPCAC reviewed every section of the IECC with the goal of simplifying the code by removing ‘mandatory’ and ‘prescriptive’ labels and finding a better way to communicate distinctions for what is required between the performance and prescriptive paths of the code.

The labels are not requirements and are not enforceable. It is SEHPCAC’s understanding that ‘mandatory’ was intended to mean ‘non-tradeable’ when using the performance compliance option, Meaning that where the procedures or systems described within the ‘mandatory’ section are included as part of the design, the requirements of that section must be met and it cannot be traded off. “Prescriptive”, on the other hand, was intended to mean “mandatory” when using the prescriptive path, but “tradeable” when using the performance path.

‘Mandatory’ requirements as they are currently found in the code are identified and made enforceable by the charging language in C401.2 (3) and C407.2 (Total Building Performance) which creates additional conflicts because the laundry lists of ‘mandatory’ provisions in those sections are not identical; the C401.2 (3) list includes C407 and C408 while the C407.2 list does not.
This proposal borrows a formatting concept from the City of Seattle using a tabular approach to clearly identify the sections that are non-tradeable (‘mandatory’) when complying with the Total Building Performance option. Proposed new Table C407.2 lists the section references to all required (‘mandatory’) measures for this specific compliance path. An identical treatment of performance paths is being proposed for the IECC-R to maintain consistent application and formatting.

The non-tradeable sections that populate the proposed new Table C407.2 were identified using the following criteria:

- The section was specifically identified as a mandatory requirement by C401.2(3)
- The section was specifically identified as a mandatory requirement by C407.2
- The subsection was specifically labeled ‘mandatory’ in the body of the code (e.g. C403.5.5 and C403.8.1) even though the charging section was not (e.g. C403.5 and C403.8) and other companion subsections were not (e.g. C403.5.2 and C403.8.5)
- For subsections, the parent section was labeled ‘mandatory’ and no subsection was labeled otherwise (e.g. C403.12)

Where all of a section has been identified as mandatory (e.g. C404), just that section number is listed in the table; a tabular footnote explains that all relative subsections are included.

Where subsections are identified as ‘prescriptive,’ but the parent section or associated subsections are identified as ‘mandatory’ (e.g. C405.3), an exception is provided for the ‘prescriptive’ subsection in new Table C407.2 to make clear which subsections apply in the Total Building Performance path.

This reason statement includes a discussion version of new Table C407.2 that features an additional column which identifies what criteria were used to establish the related section's presence in the table. This additional column is not actually proposed for inclusion in the code and is merely for the convenience of the reviewers of the proposal.

Note that the discussion version of new Table C407.2 also features expanded rows (e.g. the C404 series) to identify the relevant criteria used to validate their inclusion in new Table C407.2. The table to be include in the code has a tabular footnote to explain when all relative subsections are included.

Adoption of new Table C407.2 means that the C401.2 and C407.2 laundry lists of mandatory requirements are no longer needed.

The C401.2(3) requirement for the building energy cost to be equal to or less than 85 percent of the standard reference design building is relocated to C407.2(2).

This proposal puts all requirements for compliance with the C407 Total Building Performance option within that section; either directly or by reference via new Table C407.2.

Note that a number of the sections that the SEHPCAC reviewed did not meet the preceding criteria for populating new Table C407.2 because they were not clearly identified as either 'prescriptive' or "mandatory". Those sections are not proposed to be added to new Table C407.2 as part of this proposal. Instead, those sections are proposed to be added to new Table C407.2 through separate individual code changes.

Finally, a modification to Section R102.1.1 is required with the elimination of the labels identifying "mandatory" provisions.

Discussion Table C407.2
PROJECT REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE COMPLIANCE

Section	**Title**	**Reasoning – this column temporary will be removed for final proposal**
Envelope		
C402.5	**Air Leakage Ventilation**	Called out in C401.2 and C407.3, and Labeled
C402.5.1	Air barriers	Under Charging Lang
C402.5.1.1	Air barrier construction	Under Charging Lang
C402.5.1.2	Air barrier compliance options	Under Charging Lang
C402.5.1.2.1	Materials	Under Charging Lang
C402.5.1.2.2	Assemblies	Under Charging Lang
C402.5.2	Air leakage of fenestration	Under Charging Lang
C402.5.3	Rooms containing fuel-burning appliances	Under Charging Lang
C402.5.4	Doors and access openings to shafts, chutes, stairways and lobbies	Under Charging Lang
C402.5.5	Air intakes, exhaust openings, stairways and shafts	Under Charging Lang
C402.5.6	Loading dock weatherseals	Under Charging Lang
C402.5.7	Vestibules	Under Charging Lang
C402.5.8	Recessed lighting	Under Charging Lang
Mechanical		

C403.2	**System Design**	Called out in C401.2 and C407.3 Labeled
C403.2.1	Zone isolation required	Labeled
C403.2.2	Ventilation	Labeled
C403.3	**Heating and cooling equipment efficiencies**	Called out in C401.2 and C407.3, and Labeled
C403.3.1	Equipment sizing	Called out in C401.2 and C407.3 , Labeled
C403.3.2	HVAC equipment performance requirements	Called out in C401.2 and C407.3 , and Labeled
C403.3.2.1	Water-cooled centrifugal chilling packages	Labeled
C403.3.2.2	Positive displacement (air and water cooled) chilling packages	Under Charging Lang
C403.4	**Heating and cooling system controls**	Called out in C401.2 and C407.3, Labeled
C403.4.1	Thermostatic controls	Called out in C401.2 and C407.3, Labeled
C403.4.1.1	Heat pump supplementary heat	Called out in C401.2 and C407.3, Labeled
C403.4.1.2	Deadband	Called out in C401.2 and C407.3, Labeled
C403.4.1.3	Setpoint overlap restriction	Called out in C401.2 and C407.3, Labeled
C403.4.1.4	Heated or cooled vestibules	Called out in C401.2 and C407.3, Labeled
C403.4.1.5	Hot water boiler outdoor temperature setback control	Called out in C401.2 and C407.3, Labeled
C403.4.2	Off-hour controls	Called out in C401.2 and C407.3, Labeled
C403.4.2.1	Thermostatic setback	Called out in C401.2 and C407.3, Labeled
C403.4.2.2	Automatic setback and shutdown	Called out in C401.2 and C407.3, Labeled
C403.4.2.3	Automatic start	Called out in C401.2 and C407.3, Labeled
C403.4.3.1	Three-pipe system	Under Charging Lang
C403.4.3.2	Two-pipe changeover system	Under Charging Lang
C403.4.3.3	Hydronic (water loop) heat pump	Under Charging Lang
C403.4.3.3.1	Temperature deadband	Under Charging Lang
C403.4.3.3.2	Heat rejection	Under Charging Lang
C403.4.3.3.3	Two-position valve	Under Charging Lang
C403.5.5	Economizer fault detection and diagnostics (FDD)	Called out in C401.2 and C407.3, Labeled
C403.7	**Ventilation and exhaust systems.**	Called out in C401.2 and C407.3, Labeled
C403.7.1	Demand control ventilation	Labeled
C403.7.2	Enclosed parking garage ventilation controls	Labeled
C403.7.3	Ventilation air heating control	Labeled

C403.7.4	Energy recovery ventilation requirements	Labeled
C403.7.5	Kitchen exhaust systems	Labeled
C403.7.6	Automatic control of HVAC systems serving guestrooms	Labeled
C403.7.6.1	Temperature setpoint controls	Under Charging Lang
C403.7.6.2	Ventilation controls	Under Charging Lang
C403.7.7	Shutoff dampers	Labeled
C403.8.1	Allowable fan horsepower	Called out in C401.2 and C407.3, Labeled
C403.8.2	Motor nameplate horsepower	Called out in C401.2 and C407.3, Labeled
C403.8.3	Fan efficiency	Called out in C401.2 and C407.3, Labeled
C403.8.4	Fractional hp fan motors	Called out in C401.2 and C407.3, Labeled
C403.10.1	Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers	Called out in C401.2 and C407.3, Labeled
C403.10.2	Walk-in coolers and walk-in freezers	Called out in C401.2 and C407.3, Labeled
C403.10.2.1	Performance standards	Called out in C401.2 and C407.3, Labeled
C403.10.3	Refrigerated display cases	Called out in C401.2 and C407.3, Labeled
C403.11	**Construction of HVAC system elements.**	Called out in C401.2 and C407.3, Labeled
C403.11.1	Duct and plenum insulation and sealing	Labeled
C403.11.2	Duct construction	Labeled
C403.11.2.1	Low-pressure duct systems	Labeled
C403.11.2.2	Medium-pressure duct systems	Labeled
C403.11.2.3	High-pressure duct systems	Labeled
C403.11.3	Piping insulation	Labeled
C403.11.3.1	Protection of piping insulation	Labeled
C403.12	**Mechanical systems located outside of the building thermal envelope**	Called out in C401.2 and C407.3, Labeled
C403.12.1	Heating outside a building.	Under Charging Lang
C403.12.2	Snow- and ice-melt system controls.	Under Charging Lang
C403.12.4	Freeze protection system controls.	Under Charging Lang
Service Water Heating		

C404	**Service Water Heating in its entirety**	Called out in C401.2 and C407.3, Labeled - This entire section has been labeled Mandatory at least through 2006.
C404.2	Service water-heating equipment performance	Under Charging Lang
C404.2.1	High input service water-heating systems	Under Charging Lang
C404.3	Heat traps for hot water storage tanks.	Under Charging Lang
C404.4	Insulation of piping.	Under Charging Lang
C404.5	Heated water supply piping	Under Charging Lang
C404.5.1	Maximum allowable pipe length method.	Under Charging Lang
C404.5.2	Maximum allowable pipe volume method.	Under Charging Lang
C404.5.2.1	Water volume determination.	Under Charging Lang
C404.6	Heated-water circulating and temperature maintenance systems.	Under Charging Lang
C404.6.1	Circulation systems.	Under Charging Lang
C404.6.2	Heat trace systems	Under Charging Lang
C404.6.3	Controls for hot water storage	Under Charging Lang
C404.7	Demand recirculation controls	Under Charging Lang
C404.8	Drain water heat recovery units	Under Charging Lang
C404.9	Energy consumption of pools and permanent spas	Under Charging Lang
C404.9.1	Heaters	Under Charging Lang
C404.9.2	Time Switches	Under Charging Lang
C404.9.3	Covers	Under Charging Lang
C404.10	Energy consumption of portable spas	Under charging language and labeled
Lighting		
C405	**Lighting**	Called out in C401.2 and C407.3, Section not Labeled – but 405.3 labeled prescriptive, it is tradable
C405.1	General	Labeled
C405.2	Lighting controls	Labeled
C405.2.1	Occupant sensor controls	Under Charging Lang
C405.2.1.1	Occupant sensor control function	Under Charging Lang
C405.2.1.2	Occupant sensor control function in	Under Charging Lang

	Warehouses	
C405.2.1.2	Occupant sensor control function in open plan office areas.	Under Charging Lang
C405.2.2	Time-switch controls	Under Charging Lang
C405.2.2.1	Time-switch control functions	Under Charging Lang
C405.2.2.2	Light-reduction controls	Under Charging Lang
C405.2.3	Daylight-responsive controls	Under Charging Lang
C405.2.3.1	Daylight-responsive control function	Under Charging Lang
C405.2.3.2	Sidelit zone	Under Charging Lang
C405.2.3.3	Toplit zone	Under Charging Lang
C405.2.4	Specific application controls	Under Charging Lang
C405.2.5	Manual controls	Under Charging Lang
C405.2.6	Exterior lighting controls	Under Charging Lang
C405.2.6.1	Daylight shutoff	Under Charging Lang
C405.2.6.2	Decorative lighting shutoff	Under Charging Lang
C405.2.6.3	Lighting setback	Under Charging Lang
C405.2.6.4	Exterior time-switch control function	Under Charging Lang
C405.4	Exterior lighting power requirements	Labeled
C405.4.1	Total connected exterior building exterior lighting power	Under Charging Lang
C405.4.2	Exterior lighting power allowance	Under Charging Lang
C405.4.2.1	Additional exterior lighting power	Under Charging Lang
C405.4.3	Gas lighting	Labeled
C405.5	Dwelling electric meter	Labeled
C405.6	Electrical transformers	Labeled
C405.7	Electrical motors	Labeled
MAINTENANCE INFORMATION AND SYSTEM COMMISSIONING		
C408	System commissioning – In its entirety	Called out in 401.2

Part II: The labels “prescriptive” and “mandatory” are found in the IECC but they are not used consistently and no direction is provided for the intended application of the provisions with such labels. These terms are applied to various section and subsection titles throughout the IECC creating confusion for users of the code. The SEHPCAC reviewed every section of the IECC with the goal of simplifying the code by removing ‘mandatory’ and ‘prescriptive’ labels and finding a better way to communicate distinctions for what is required between the performance and prescriptive paths of the code.

The labels are not requirements and are not enforceable. It is SEHPCAC's understanding that 'mandatory' was intended to mean 'non-tradeable' when using performance compliance options, meaning that where the procedures or systems described within the 'mandatory' section are included as part of the design, the requirements of that section must be met and it cannot be traded off. "Prescriptive", on the other hand, was intended to mean "mandatory" when using the prescriptive path, but "tradeable" when using the performance path.

'Mandatory' requirements for the Total Building Performance compliance alternative as they are currently found in the code are identified and made enforceable by the charging language in R401.2 (2) and by reference from R405.2 (Mandatory requirements). "Mandatory" requirements for the Energy Rating Index compliance alternative as they are currently found in the code are identified and made enforceable by the charging language in R406.2 (Mandatory requirements).

This proposal borrows a formatting concept from the City of Seattle using a tabular approach to clearly identify the sections that are non-tradeable ('mandatory') when complying with either of the performance compliance alternatives. Proposed new Table R405.2 lists the section references to all required ('mandatory') measures for this specific compliance path, and proposed new Table R406.2 lists the section references to all required ("mandatory") measures for that specific compliance path.(An identical treatment of the performance path is also being proposed for the IECC-C to maintain consistent application and formatting).

The non-tradeable sections that populate the proposed new Tables R405.2 and R406.2 were identified using the following criteria:

- The section was specifically identified as a mandatory requirement by R401.2 (2) or R406.2.
- The subsection was specifically labeled 'mandatory' in the body of the code (e.g. R403.3.2) even though the parent section was not (R403.3) and other companion subsections were not (e.g. R403.3.1)
- For subsections, the parent section was labeled 'mandatory' and no subsection was labeled otherwise (e.g. R402.4)
- Compliance was required by reference to another code (e.g. R402.1.1)

Where all of a section has been identified as mandatory (e.g. R402.4), just that section number is listed in the table; a tabular footnote explains that all relative subsections are included.

Where subsections are identified as 'prescriptive,' (e.g. R403.3.1), but the parent section or associated subsections are identified as 'mandatory' (e.g. R403.3.2), an exception is provided for the 'prescriptive' subsection in new Tables R405.2 and R406.2 to make clear which subsections apply in each performance compliance alternative.

This reason statement includes a discussion version of new Tables R405.2/R406.2 that features an additional column which identifies what criteria were used to establish the related section's presence in the table. This additional column is not actually proposed for inclusion in the code and is merely for the convenience of the reviewers of the proposal.

Note that the discussion version of new Tables R405.2/R406.2 also features expanded rows (e.g. the R402.4 series) to identify the relevant criteria used to validate their inclusion in the new tables.

Adoption of new Tables R405.2 and R406.2 means that the R401.2 (2) and R406.2 laundry lists of mandatory requirements are no longer needed and that all 'mandatory' and 'prescriptive' labels are no longer needed.

Note that a number of the sections that the SEHPCAC reviewed did not meet the preceding criteria for populating new Tables R405.2 and R406.2 because they were not clearly 'prescriptive' or tradeable. Those sections are not proposed to be added to either new table as part of this proposal. Instead, those sections are proposed to be added to the new tables through separate individual code changes. SEHPCAC has simply called out these provisions to aid the committee's and membership's decision as to whether any of those individual sections is actually 'mandatory' or non-tradeable and appropriate for inclusion in new Tables R405.2 and R406.2.

Finally, a modification to Section R102.1.1 is required with the elimination of the labels identifying “mandatory” provisions.

Section	Title	Reasoning
General		
R401.3	Certificate	Labeled
Envelope		
R402.1.1	Vapor Retarder	References IRC, in which it is required
R402.4	**Air Leakage**	Labeled
R402.4.1	Building thermal envelope	Under Charging Lang Consist
R402.4.1.1	Installation	Under Charging Lang Consist
R402.4.1.2	Testing	Under Charging Lang Consist
R402.4.2	Fireplaces	Under Charging Lang Consist
R402.4.3	Fenestration air leakage	Under Charging Lang Consist
R402.4.4	Rooms containing fuel burning appliances	Under Charging Lang Consist
R402.4.5	Recessed lighting	Under Charging Lang Consist
R402.5	Maximum fenestration U-factor and SHGC	Included only in Table R405.2 - Labeled
R406.3	Building Thermal Envelope	Included only in Table R406.2 - Specified in Mandatory provisons Section R406.2 and Table R406.4 footnote a
Mechanical		
R403.1	Controls	Labeled
R403.1.1	Programmable thermostat	Under charging lang
R403.1.2	Heat pump supplementary heat	Labeled
R403.3.2	Sealing	Labeled
R403.3.2.1	Sealed air handler	Under charging lang
R403.3.3	Duct testing	Labeled
R403.3.5	Building cavities	Labeled
R403.4	Mechanical system piping insulation	Labeled
R403.4.1	Protection of piping insulation	Under charging lang
R403.5.1	Heated water circulation and temperature maintenance systems	Labeled
R403.5.1.1	Circulation systems	Under charging lang
R403.5.1.2	Heat trace systems	Under charging lang
R403.6	Mechanical ventilation	Labeled
R403.6.1	Whole-house mechanical ventilation system fan efficiency	Under charging lang

R403.7	Equipment sizing and efficiency rating	Labeled
R403.8	Systems serving multiple dwelling units	Labeled
R403.9	Snow melt and ice systems	Labeled
R403.10	Pools and permanent spa energy consumption	Labeled
R403.10.1	Heaters	Under charging lang
R403.10.2	Time switches	Under charging lang
R403.10.3	Covers	Under charging lang
R403.11	Portable spas	Labeled
Lighting		
R404.1	Lighting equipment	Labeled
R404.1.1	Lighting equipment	Labeled

This proposal is submitted by the ICC Sustainable, Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance International Codes with regard to sustainability, energy and high performance as it relates to the built environment included, but not limited to, how these criteria relate to the International Green Construction Code (IgCC) and the International Energy Conservation Code (IECC). In 2018-2019, the SEHPCAC has held five two- or three-day open meetings and numerous workgroup calls, to discuss and debate proposed changes and public comments. Attendees at the meetings and calls included members of the SEHPCAC as well as any interested parties. Related documentation and reports are posted on the SEHPCAC website at: http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx (http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx)

Cost Impact: The code change proposal will not increase or decrease the cost of construction This is a restructuring of information on mandatory provisions, no change to the provisions themselves. It does not add to nor detract from design and construction requirements.

Updated April 2, 2019

CE44-19: Replace the code change proposal with the following (No change to the reason or cost impact): Staff analysis has been added.

CE44-19

C401.1, C401.2, RE RESNET Ch 6

Proponent: Gayathri Vijayakumar, Steven Winter Associates, Inc., representing Steven Winter Associates, Inc. (gayathri@swinter.com); Robby Schwarz, EnergyLogic, representing EnergyLogic (robby@nrglogic.com)

2018 International Energy Conservation Code

Revise as follows:

C401.1 Scope. The provisions in this chapter are applicable to commercial buildings and their building sites.

C401.2 Application. Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1.
2. The requirements of Sections C402 through C405 and C408. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.

   Exception: Dwelling units and sleeping units in Group R-2 buildings shall be deemed to be in compliance with this chapter provided they comply with Section R406.

3. The requirements of Sections C402.5, C403.2, C403.3 through C403.3.2, C403.4 through C403.4.2.3, C403.5.5, C403.7, C403.8.1 through C403.8.4, C403.10.1 through C403.10.3, C403.11, C403.12, C404, C405, C407 and C408. The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

RESNET

Residential Energy Services Network, Inc.
P.O. Box 4561
Oceanside, CA 92052-4561

ANSI/RESNET/ICC ~~301—2014~~ 301—2019: Standard for the Calculation and Labeling of the Energy Performance of ~~Low-rise Residential Buildings~~ Dwelling and Sleeping Units using an Energy Rating ~~Index First Published March 7, 2014—Republished January 2016~~ Index

Staff Analysis: The proposal is dependent upon the RESNET standard referenced in R406 being updated as shown.

CE53-19: Replace the code change proposal with the following (No change to the reason or cost impact):

CE53-19

Proponent: jim edelson, representing New Buildings Institute (jim@newbuildings.org)

2018 International Energy Conservation Code

SECTION C202
GENERAL DEFINITIONS

Add new definition as follows:

RENEWABLE ENERGY CERTIFICATE (REC). An instrument that represents the environmental attributes of one megawatt-hour of renewable electricity; also known as an energy attribute certificate (EAC).

Add new text as follows:

C401.2.2 On-site renewable energy. Each building site shall have equipment for on-site renewable energy with a rated capacity of not less than 0.25 W/ft² (2.7 W/m²) multiplied by the sum of the gross conditioned floor area of the three largest floors. Documentation shall be provided to the code official that indicates that renewable energy certificates (RECs) associated with the on-site renewable energy will be retained and retired by or on behalf of the owner or tenant.

Exceptions:

1. Any building located where an unshaded flat plate collector oriented towards the equator and tilted at an angle from horizontal equal to the latitude receives an annual daily average incident solar radiation less than 3.5 kWh/m²·day (1.1 kBtu/ft²·day).
2. Any building where more than 80 percent of the roof area is covered by any combination of equipment other than for on-site renewable energy systems, planters, vegetated space, skylights or occupied roof deck.
3. Any building where more than 50 percent of roof area is shaded from direct-beam sunlight by natural objects or by structures that are not part of the building for more than 2,500 annual hours between 8:00 AM and 4:00 PM.

Revise as follows:

C406.5 On-site renewable energy. The total minimum ratings of *on-site renewable energy* systems, not including *on-site renewable energy* system capacity used for compliance with Section C401.2.2, shall be one of the following:

1. Not less than 1.71 Btu/h per square foot (5.4 W/m²) or 0.50 watts per square foot (5.4 W/m²) of conditioned floor area.
2. Not less than 3 percent of the energy used within the building for building mechanical and service water heating equipment and lighting regulated in Chapter 4.

CE60-19: Corrected reason statement for Part I & Part II

CE60-19

Proponent: John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:
Part I: This proposal provides for the appropriate addition of insulation material layers within a given insulation component and also clarifies that different insulation components (e.g., cavity + continuous insulation) R-values cannot be added together because it will not result in equivalent performance due to cavity insulation components being interrupted by framing and continuous insulation not interrupted by framing. To properly account for this, the U-factor method and an appropriate calculation procedure must be used.

Part II: This proposal coordinates with proposed revisions to the IECC-C regarding appropriate consideration of multiple layers of insulation within a given insulation component and also clarifies that different insulation components (e.g., cavity insulation & continuous insulation) R-values cannot be summed because the mathematical result will not result in equivalent thermal performance due to cavity insulation components being interrupted by framing and continuous insulation not interrupted by framing.

CE61-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE61-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Metal buildings[b]	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-25 + R-11 LS	~~R-25 + R-11 LS~~ R-30 + R-11 LS	R-30 + R-11 LS	R-30 + R-11 LS	~~R-30 + R-11 LS~~ R-25 + R-11 + R-11 LS	~~R-30 + R-11 LS~~ R-25 + R-11 + R-11 LS
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	~~R-38~~ R-49	~~R-38~~ R-49	~~R-38~~ R-49	R-49	R-49	R-49	~~R-49~~ R-60	~~R-49~~ R-60	~~R-49~~ R-60	~~R-49~~ R-60

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. “Mass floors” shall be in accordance with Section C402.2.3.

f. Steel floor joist systems shall be insulated to R-38.
g. “Mass walls” shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Metal buildings	~~U-0.044~~ U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.031	U-~~0.031~~ U-0.029	U-0.029	U-0.029	~~U-0.029~~ U-0.026	~~U-0.029~~ U-0.026
Attic and other	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	~~U-0.027~~ U-0.021	~~U-0.027~~ U-0.021	~~U-0.027~~ U-0.021	U-0.021	U-0.021	U-0.021	~~U-0.021~~ U-0.017	~~U-0.021~~ U-0.017	~~U-0.021~~ U-0.017	~~U-0.021~~ U-0.017

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. “Mass floors” shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. “Mass walls” shall be in accordance with Section C402.2.2.

CE62-19: Corrected reason statement and documentation for Part I & Part II

CE62-19

Proponent: John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:
Part I: The elements of a wall to the exterior of a vented air space are disconnected thermally from the rest of the thermal envelope of the structure. Accordingly, components of walls to the exterior of a vented wall space should not be considered a mass wall component of the building thermal envelope. This is an important clarification to avoid unintended mis-characterization of mass walls. This is also necessary to be consistent with requirements for mass walls in IECC-R Section R402.2.5 (see Part II of the proposal). These changes are needed to clearly recognize that the "mass" of a mass wall must be an thermally integral part of the wall (not disconnected thermally by a vented air space) as was the basis for determining thermal inertia (thermal mass) effects and associated R-value requirements for mass wall assemblies.

This proposal separates into a new section the criteria for a mass wall to be considered a component of the building thermal envelope.

Also, this proposal suggests an editorial revision to remove the quotes from "Mass walls" in the only three locations in the I-Codes. Mass walls – without quotes – is in 26 other locations in the I-Codes.

Part II: In Item 1, anchored brick veneer, anchored stone, and anchored masonry veneer are required by IRC Section R703.8 and Table R703.8.4(1) to be installed with an airspace of between 1" and 4 ½". The components of a wall to the exterior of a non-sealed (vented) air space required to provide drainage are disconnected thermally from the rest of the thermal envelope of the structure. Accordingly, components of walls to the exterior of a vented air space should not be considered a component of the building thermal envelope. This situation was recognized in Item 1 with the original text of "but not brick veneer". This proposal, for clarity, moves "but not brick veneer" to the end of the sentence and includes *anchored stone* and *masonry veneer* which performs thermally similar to brick veneer. Also, "anchored" is inserted in two locations to appropriately differentiate anchored veneer with the required airspace from adhered masonry veneer addressed in IRC Section R703.12. Proposed revisions in Item 2 exclude components of the wall to the exterior of a vented air space from the heat capacity calculation because these components are disconnected thermally from the rest of the thermal envelope of the structure.

This proposal is consistent with requirements for mass walls in IECC-C Section C402.2.2 which is similarly clarified in a separate proposal. These changes are needed to clearly recognize that the "mass" of a mass wall must be an integral part of the wall (not thermally disconnected by a vented air space) as was the basis for determining thermal inertia (thermal mass) effects and associated R-value requirements for mass wall assemblies.

Cost Impact: The code change proposal will increase the cost of construction
Part I: If wall elements to the exterior of a vented air space have been included when evaluating walls to the mass wall criteria of this section, this proposal will raise the cost of construction if these exterior wall components to the exterior of a vented air space have been treated as components of mass walls and as components of the thermal envelope.

Part II: The revisions in Item 1 should not raise the cost of construction because the proposed revisions are consistent with the intent of Item 1. In Item 2, if exterior wall components to the exterior of a vented air space have been considered mass walls in conflict with the intent of Item 1, there could be a cost increase.

CE63-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE63-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Walls, above grade																
Mass[g]	R-5.7ci[c]	R-5.7ci[c]	R-5.7ci[c]	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci	R-15.2ci	R-15.2ci	R-25ci	R-25ci
Metal building	R-13+ R-6.5ci	R-13 + R-6.5ci	R13 + R-6.5ci	R-13 + R-13ci	R-13 + R-6.5ci	R-13 + R-13ci	R-13 + R-13ci	~~R-13 + R-13ci~~ R-13 + R-14ci	~~R-13 + R-13ci~~ R-13 + R-14ci	~~R-13 + R-13ci~~ R-13 + R-14ci	~~R-13 + R-13ci~~ R-13 + R-14ci	~~R-13 + R-13ci~~ R-13 + R-14ci	~~R-13 + R-13ci~~ R-13 + R-17ci	R-13+ R-19.5ci	~~R-13 + R-13ci~~ R-13 + R-19.5ci	R-13+ R-19.5ci
Metal framed	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	~~R-13 + R-7.5ci~~ R-13 + R-10ci	~~R-13 + R-7.5ci~~ R-13 + R-10ci	~~R-13 + R-7.5ci~~ R-13 + R-12.5ci	~~R-13 + R-7.5ci~~ R-13 + R-12.5ci	~~R-13 + R-7.5ci~~ R-13 + R-12.5ci	~~R-13 + R-7.5ci~~ R-13 + R-12.5ci	R-13 + R-15.6ci	~~R-13 + R-7.5ci~~ R-13 + R-18.8ci	~~R-13+ R17.5ci~~ R-13 + R-18.8ci
Wood framed and other	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	R-13 + R-3.8ci or R-20	~~R-13 + R-3.8ci or R-20~~ R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	~~R13 + R-15.6ci or R-20 + R-10ci~~ R-13 + R-18.8ci	~~R13 + R-15.6ci or R-20 + R-10ci~~ R-13 + R-18.8ci

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		**2**		**3**		**4 EXCEPT MARINE**		**5 AND MARINE 4**		**6**		**7**		**8**	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Walls, above grade																
Mass[g]	U-0.151	U-0.151	U-0.151	U-0.123	U-0.123	U-0.104	U-0.104	U-0.090	U-0.090	U-0.080	U-0.080	U-0.071	U-0.071	U-0.071	~~U-0.061~~ U-0.037	~~U-0.061~~ U-0.037
Metal building	U-0.079	U-0.079	U-0.079	U-0.079	U-0.079	U-0.052	U-0.052	~~U-0.052~~ U-0.050	~~U-0.052~~ U-0.050	~~U-0.052~~ U-0.050	U-0.052 U-0.050	~~U-0.052~~ U-0.050	~~U-0.052~~ U-0.044	U-0.039	~~U-0.052~~ U-0.039	U-0.039
Metal framed	U-0.077	U-0.077	U-0.077	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	~~U-0.064~~ U-0.055	~~U-0.064~~ U-0.055	~~U-0.064~~ U-0.049	~~U-0.064~~ U-0.049	~~U-0.064~~ U-0.049	~~U-0.052~~ U-0.042	~~U-0.064~~ U-0.037	~~U-0.045~~ U-0.037
Wood framed and other[c]	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	~~U-0.064~~	~~U-0.064~~	U-0.051	U-0.051	U-0.051	U-0.051	~~U-0.036~~	~~U-0.036~~

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
									U-0.051	U-0.051					U-0.032	U-0.032

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. “Mass floors” shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. “Mass walls” shall be in accordance with Section C402.2.2.

CE64-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE64-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Walls, below grade																
Below-grade wall[d]	NR	NR	NR	NR	NR	NR	R-7.5ci	~~R-7.5ci~~ R-10ci	R-7.5ci	~~R-7.5ci~~ R-10ci	~~R-7.5ci~~ R-10ci	~~R-7.5ci~~ R-15ci	~~R-10ci~~ R-15ci	~~R-10ci~~ R-15ci	~~R-10ci~~ R-15ci	~~R-12.5ci~~ R-15ci

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. “Mass floors” shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. “Mass walls” shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Walls, below grade																
Below-grade wall[c]	C-1.140[e]	C-1.140[e]	C-1.140[e]	C-1.140[e]	C-1.140[e]	C-1.140[e]	C-0.119	~~C-0.119~~ C-0.092	C-0.119	~~C-0.119~~ C-0.092	~~C-0.119~~ C-0.092	~~C-0.119~~ C-0.063	~~C-0.092~~ C-0.063	~~C-0.092~~ C-0.063	~~C-0.092~~ C-0.063	~~C-0.092~~ C-0.063

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE65-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE65-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Floors																
Mass[e]	NR	NR	R-6.3ci	R-8.3ci	R-10ci	R-10ci	R-10ci	R-10.4ci	R-10ci	R-12.5ci	R-12.5ci	R-12.5ci	R-15ci	R-16.7ci	R-15ci	R-16.7ci
Joist/framing	~~NR~~ R-13	~~NR~~ R-13	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30[f]	R-30[f]	R-30[f]	R-30[f]	R-30[f]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Floors																
Mass[d]	U-0.322[e]	U-0.322[e]	U-0.107	U-0.087	U-0.076	U-0.076	U-0.076	U-0.074	U-0.074	U-0.064	U-0.064	U-0.064	U-0.055	U-0.051	U-0.055	U-0.051

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Joist/framing	U-0.066~~e~~	U-0.066~~e~~	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE66-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE66-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Floors																
Mass[e]	NR	NR	R-6.3ci	R-8.3ci	R-10ci	R-10ci	~~R-10ci~~	~~R-10.4ci~~	~~R-10ci~~	~~R-12.5ci~~	~~R-12.5ci~~	~~R-12.5ci~~	~~R-15ci~~	~~R-16.7ci~~	~~R-15ci~~	~~R-16.7ci~~ R-23ci

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
							R-14.6ci	R-16.7ci	R-14.6ci	R-16.7ci	R-16.7ci	R-16.7ci	R-20.9ci	R-20.9ci	R-23ci	
Joist/framing	~~NR~~ R-13	~~NR~~ R-13	R-30	R-30	R-30	R-30	R-30	R-30	R-30	R-30	~~R-30~~ R-38	~~R-30[f]~~ R-38	~~R-30[f]~~ R-38	~~R-30[f]~~ R-38	~~R-30[f]~~ R-38	~~R-30[f]~~ R-38

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3.
~~f. Steel floor joist systems shall be insulated to R-38.~~
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Floors																
Mass[d]	U-0.322[e]	U-0.322[e]	U-0.107	U-0.087	~~U-0.076~~ U-0.074	~~U-0.076~~ U-0.074	~~U-0.076~~ U-0.057	~~U-0.074~~ U-0.051	~~U-0.074~~ U-0.057	~~U-0.064~~ U-0.051	~~U-0.064~~ U-0.051	~~U-0.064~~ U-0.051	~~U-0.055~~ U-0.042	~~U-0.051~~ U-0.042	~~U-0.055~~ U-0.038	~~U-0.051~~ U-0.038
Joist/framing	U-0.066[e]	U-0.066	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	~~U-0.033~~ U-0.027	~~U-0.033~~ U-0.027	~~U-0.033~~ U-0.027	~~U-0.033~~ U-0.027	~~U-0.033~~ U-0.027	~~U-0.033~~ U-0.027

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

Updated 4/17/2019

CE67-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda. Correction to Proponent name from the Update dated 4/2/2019.

CE67-19

Proponent: Darren Meyers, P.E., International Energy Conservation Consultants LLC, representing Self (dmeyers@ieccode.com)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Slab-on-grade floors																
Unheated slabs	NR	NR	NR	NR	NR	NR	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-15 for 24″ below	R-15 for 24″ below	R-15 for 24″ below	R-15 for 24″ below	R-20 for 24″ below
Heated slabs[h]	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. "Mass floors" shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. "Mass walls" shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for full, under-slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Slab-on-grade floors																
Unheated slabs	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.54	F-0.54	F-0.54	F-0.54	F-0.54	F-0.52	F-0.40	F-0.40	F-0.40	F-0.40
Heated slabs[f]	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-0.90 0.74	F-0.90 0.74	F-0.86 0.64	F-0.86 0.64	F-0.79 0.64	F-0.79 0.64	F-0.79 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full, under- slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE68-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE68-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

Slab-on-grade floors																
Unheated slabs	NR	NR	NR	NR	NR	~~NR~~ R-10 for 24" below	~~R-10 for 24" below~~ R-15 for 24" below	~~R-10 for 24" below~~ R-15 for 24" below	~~R-10 for 24" below~~ R-15 for 24" below	~~R-10 for 24" below~~ R-20 for 24" below	~~R-10 for 24" below~~ R-20 for 24" below	~~R-15 for 24" below~~ R-20 for 48" below	R-15 for 24″ below	R-15 for 24″ below	R-15 for 24″ below	R-20 for 24″ below
Heated slabs[h]	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. “Mass floors” shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. “Mass walls” shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

Slab-on-grade floors																
Unheated slabs	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	~~F-0.73[e]~~ F-0.54	~~F-0.54~~ F-0.52	~~F-0.54~~ F-0.52	~~F-0.54~~ F-0.52	~~F-0.54~~ F-0.51	~~F-0.54~~ F-0.51	~~F-0.52~~ F-0.434	F-0.40	F-0.40	F-0.40	F-0.40
Heated slabs[f]	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-0.90 0.74	F-0.90 0.74	F-0.86 0.64	F-0.86 0.64	F-0.79 0.64	F-0.79 0.64	F-0.79 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. “Mass floors” shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. “Mass walls” shall be in accordance with Section C402.2.2.

Updated 4/17/2019

CE69-19: Tables C402.1.3 and C402.1.4 were cut off in the Committee Action Hearing Agenda

CE69-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

(Portions of table not shown remain unchanged)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, i]

Slab-on-grade floors																
Unheated slabs	NR	NR	NR	NR	NR	NR	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-10 for 24″ below	R-15 for 24″ below	~~R-15 for 24″ below~~ R-20 for 48" below	~~R-15 for 24″ below~~ R-20 for 48" below	~~R-15 for 24″ below~~ R-20 for 48" below	~~R-20 for 24″ below~~ R-25 for 48" below
Heated slabs[h]	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-7.5 for 12″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-10 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 24″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-15 for 36″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab	R-20 for 48″ below+ R-5 full slab

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using *R*-value compliance method, a thermal spacer block shall be provided, otherwise use the *U*-factor compliance method in Table C402.1.4.
c. R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with materials having a maximum thermal conductivity of 0.44 Btu-in/h-f^2 °F.
d. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
e. “Mass floors” shall be in accordance with Section C402.2.3.
f. Steel floor joist systems shall be insulated to R-38.
g. “Mass walls” shall be in accordance with Section C402.2.2.
h. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
i. Not applicable to garage doors. See Table C402.1.4.

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

Slab-on-grade floors																
Unheated slabs	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	~~F-0.73[e]~~	~~F-0.54~~	~~F-0.54~~	~~F-0.54~~	~~F-0.54~~	~~F-0.54~~	~~F-0.52~~	F-0.40 F-0.51	0.40 F-0.434	F-0.40 F-0.434	F-0.40 F-0.424
Heated slabs[f]	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-1.02 0.74	F-0.90 0.74	F-0.90 0.74	F-0.86 0.64	F-0.86 0.64	F-0.79 0.64	F-0.79 0.64	F-0.79 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55	F-0.69 0.55

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE70-19: Image in the cost impact was cut off in the CAH

CE70-19

IECC: TABLE C402.1.3, TABLE C402.1.4, C402.4.5, C402.4.5.1(New), C402.4.5.2(New)

Proponent: Connor Barbaree, representing ASHRAE (cbarbaree@ashrae.org)

Cost Impact: The code change proposal will increase the cost of construction
Using national energy costs of $1.22/therm for natural gas, $.0939 for electricity, and a 40 year life time, as expressed in the formula LLC = ($U*SR_h*H_{coef}*HDD*P_h$) + ($U*SR_c*((C_{coef1}* CDD)+C_{oef2})*P_c$)), the proposed door criteria have the lowest Life Cycle Cost as indicated in the table below. For an explanation of the formula above, see Development of Economic Scalar Ratios for ASHRAE Standard 90.1.

Swinging Doors

I-P Description	Cost	U-factor
uninsulated	0.00	0.7000
1 3/8 polyurethane	0.50	0.3700
1 3/4 polyurethane	4.08	0.3400
frame and door	9.17	0.3100

	Description	Uvalue	LCC
CZ 8	uninsulated	0.700	50.89
	1 3/8 polyurethane	**0.370**	**27.40**
	1 3/4 polyurethane	0.340	28.80
	frame and door	0.310	31.71
CZ 7	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	37.65
	1 3/8 polyurethane	**0.370**	**20.40**
	1 3/4 polyurethane	0.340	22.37
	frame and door	0.310	25.84
CZ 6	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	30.74
	1 3/8 polyurethane	**0.370**	**16.75**
	1 3/4 polyurethane	0.340	19.01
	frame and door	0.310	22.78
CZ 5	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	24.73
	1 3/8 polyurethane	**0.370**	**13.57**
	1 3/4 polyurethane	0.340	16.09
	frame and door	0.310	20.12
CZ 4	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	20.47
	1 3/8 polyurethane	**0.370**	**11.32**
	1 3/4 polyurethane	0.340	14.02
	frame and door	0.310	18.24
CZ 3	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	14.21
	1 3/8 polyurethane	**0.370**	**8.01**
	1 3/4 polyurethane	0.340	10.98
	frame and door	0.310	15.46
CZ 2	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	11.02
	1 3/8 polyurethane	**0.370**	**6.32**
	1 3/4 polyurethane	0.340	9.43
	frame and door	0.310	14.05
CZ 1	**Description**	**Uvalue**	**LCC**
	uninsulated	0.700	10.75
	1 3/8 polyurethane	**0.370**	**6.18**
	1 3/4 polyurethane	0.340	9.30
	frame and door	0.310	13.93

NonSwinging Doors

I-P Description	Cost	U-factor
uninsulated	0.00	1.4500
1 3/8 inch	4.46	0.3600
2 inch	5.36	0.3100
3 inch #1	10.27	0.2700
3 inch #2	20.54	0.2400

	Description	Uvalue	LCC
CZ 8	uninsulated	1.450	105.41
	1 3/8 inch	0.360	30.63
	2 inch	**0.310**	**27.90**
	3 inch #1	0.270	29.90
	3 inch #2	0.240	37.99
CZ 7	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	77.99
	1 3/8 inch	0.360	23.82
	2 inch	**0.310**	**22.03**
	3 inch #1	0.270	24.79
	3 inch #2	0.240	33.45
CZ 6	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	63.67
	1 3/8 inch	0.360	20.27
	2 inch	**0.310**	**18.97**
	3 inch #1	0.270	22.13
	3 inch #2	0.240	31.08
CZ 5	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	51.23
	1 3/8 inch	0.360	17.18
	2 inch	**0.310**	**16.31**
	3 inch #1	0.270	19.81
	3 inch #2	0.240	29.02
CZ 4	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	42.41
	1 3/8 inch	0.360	14.99
	2 inch	**0.310**	**14.43**
	3 inch #1	0.270	18.17
	3 inch #2	0.240	27.56
CZ 3	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	29.44
	1 3/8 inch	0.360	11.77
	2 inch	**0.310**	**11.65**
	3 inch #1	0.270	15.75
	3 inch #2	0.240	25.41
CZ 2	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	22.83
	1 3/8 inch	0.360	10.13
	2 inch	**0.310**	**10.24**
	3 inch #1	0.270	14.52
	3 inch #2	0.240	24.32
CZ 1	**Description**	**Uvalue**	**LCC**
	uninsulated	1.450	22.26
	1 3/8 inch	0.360	9.99
	2 inch	**0.310**	**10.12**
	3 inch #1	0.270	14.42
	3 inch #2	0.240	24.22

CE73-19: Table C402.1.4 was cut off in the Committee Action Hearing Agenda

CE73-19

Proponent: Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, representing BCAP-IBTS (mguttpgh@aol.com)

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Roofs																
Insulation entirely above roof deck	U-0.048	U-0.039	U-0.039	U-0.039	U-0.039	U-0.039	U-0.032	U-0.032	U-0.032	U-0.032	U-0.032	U-0.032	U-0.028	U-0.028	U-0.028	U-0.028
Metal buildings	~~U-0.044~~ U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.035	U-0.031	U-0.031	U-0.029	U-0.029	U-0.029	U-0.029
Attic and other	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.021	U-0.021	U-0.021	U-0.021	U-0.021	U-0.021	U-0.021

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE74-19: Table C402.1.4 was cut off in the Committee Action Hearing Agenda

CE74-19

Proponent: Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, representing BCAP-IBTS (mguttpgh@aol.com)

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Walls, above grade																
Mass[g]	U-0.151	U-0.151	U-0.151	U-0.123	U-0.123	U-0.104	U-0.104	U-0.090	U-0.090	U-0.080	U-0.080	U-0.071	U-0.071	U-0.071	~~U-0.061~~ U-0.037	~~U-0.061~~ U-0.037
Metal building	U-0.079	U-0.079	U-0.079	U-0.079	U-0.079	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.039	U-0.052	U-0.039
Metal framed	U-0.077	U-0.077	U-0.077	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.052	U-0.064	U-0.045
Wood framed and other[c]	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.051	U-0.051	U-0.051	U-0.051	U-0.036	U-0.036

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. “Mass floors” shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. “Mass walls” shall be in accordance with Section C402.2.2.

CE75-19: Table C402.1.4 was cut off in the Committee Action Hearing Agenda

CE75-19

Proponent: Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, representing BCAP-IBTS (mguttpgh@aol.com)

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
CLIMATE ZONE	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**	**All other**	**Group R**
Walls, above grade																
Mass[g]	U-0.151	U-0.151	U-0.151	U-0.123	U-0.123	U-0.104	U-0.104	U-0.090	U-0.090	U-0.080	U-0.080	U-0.071	U-0.071	U-0.071	U-0.061	U-0.061
Metal building	U-0.079	U-0.079	U-0.079	U-0.079	U-0.079	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.052	U-0.039	U-0.052	U-0.039
Metal framed	U-0.077	U-0.077	U-0.077	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	~~U-0.052~~ U-0.042	U-0.064	U-0.045
Wood framed and other[c]	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	U-0.064	~~U-0.064~~ U-0.051	U-0.051	U-0.051	U-0.051	U-0.051	U-0.036	U-0.036

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE76-19: Table C402.1.4 was cut off in the Committee Action Hearing Agenda

CE76-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

Slab-on-grade floors																
Unheated slabs	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.73[e]	F-0.54	F-0.54	F-0.54	F-0.54	F-0.54	F-0.52	F-0.40	F-0.40	F-0.40	F-0.40
Heated slabs[f]	F-~~1.02~~ ~~0.74~~ 0.69	F-~~1.02~~ ~~0.74~~ 0.69	F-~~1.02~~ ~~0.74~~ 0.69	F-~~1.02~~ ~~0.74~~ 0.69	F-~~0.90~~ ~~0.74~~ 0.66	F-~~0.90~~ ~~0.74~~ 0.66	F-~~0.86~~ ~~0.64~~ 0.62	F-~~0.86~~ ~~0.64~~ 0.62	F-~~0.79~~ ~~0.64~~ 0.62	F-~~0.79~~ ~~0.64~~ 0.62	F-~~0.79~~ ~~0.55~~ 0.62	F-~~0.69~~ ~~0.55~~ 0.602	F-~~0.69~~ ~~0.55~~ 0.602	F-~~0.69~~ ~~0.55~~ 0.602	F-~~0.69~~ ~~0.55~~ 0.602	F-~~0.69~~ ~~0.55~~ 0.602

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
~~f. The first value is for perimeter insulation and the second value is for full slab insulation.~~
g. "Mass walls" shall be in accordance with Section C402.2.2.

CE77-19: Table C402.1.4 was cut off in the Committee Action Hearing Agenda

CE77-19

Proponent: Joseph Hetzel, representing Door & Access Systems Manufacturers Association (Jhetzel@thomasamc.com)

(Portions of table not shown remain unchanged)

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, *U*-FACTOR METHOD[a, b]

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Opaque doors																
Swinging door	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.61	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37
Garage door <14% glazing[h]	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly *U*-factors, *C*-factors, and *F*-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where *U*-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The *R*-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the *U*-factor requirements for above-grade mass walls.
d. “Mass floors” shall be in accordance with Section C402.2.3.
e. These *C*-, *F*- and *U*-factors are based on assemblies that are not required to contain insulation.
f. The first value is for perimeter insulation and the second value is for full slab insulation.
g. “Mass walls” shall be in accordance with Section C402.2.2.
h. Garage doors having a single row of *fenestration* shall have an assembly U-factor less than or equal to 0.44 in Climate Zones 1 through 6 and less than or equal to 0.36 in Climate Zones 7 and 8, provided that the*fenestration* area is not less than 14 percent and not more than 25 percent of the total door area.

CE78-19 Part I: Banner added to explain what committee will hear the code change

CE78-19 Part I

Proponent: William Warlick, representing Self (william.warlick@slcgov.com); Don Davies (don.davies@slcgov.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

CE82-19: Code change proposal did not appear in the Committee Action Hearing Agenda

CE82-19

IECC: C402.3

Proponent: Jonathan Siu, City of Seattle Department of Construction and Inspections, representing Washington Association of Building Officials Technical Code Development Committee (Jon.Siu@seattle.gov)

2018 International Energy Conservation Code

Revise as follows:

C402.3 Roof solar reflectance and thermal emittance. Low-sloped roofs directly above cooled conditioned spaces in *Climate Zones* 1, 2 and 3 shall comply with one or more of the options in Table C402.3.

Exceptions: The following roofs and portions of roofs are exempt from the requirements of Table C402.3:

1. Portions of the roof that include or are covered by the following:
    1. Photovoltaic systems or components.
    2. Solar air or water-heating systems or components.
    3. ~~Roof gardens or landscaped~~ Landscaped roofs.
    4. Above-roof decks or walkways.
    5. Skylights.
    6. HVAC systems and components, and other opaque objects mounted above the roof.
2. Portions of the roof shaded during the peak sun angle on the summer solstice by permanent features of the building or by permanent features of adjacent buildings.
3. Portions of roofs that are ballasted with a minimum stone ballast of 17 pounds per square foot [74 kg/m^2] or 23 psf [117 kg/m^2] pavers.
4. Roofs where not less than 75 percent of the roof area complies with one or more of the exceptions to this section.

Reason: This proposal is purely editorial, aligning terms and replacing two undefined terms with one. This is a follow-up to code change proposal FS153-18, which was approved 13-0 by the Fire Safety Committee in Group A and aligned the terms in the IBC and IFC. This proposal will align the IECC with the IBC and IFC, consistent with the action taken in Group A on FS153-18.

While "vegetative roof" is a defined term (essentially part of the building envelope) the I-codes usually, but not always, use the undefined terms "roof garden" and "landscaped roofs" in conjunction with each other ("roof gardens and landscaped roofs"). Occasionally, they appear in conjunction with "vegetative roof." Based on the context of use, it appears the accepted concept is roof gardens and landscaped roofs are not part of the building envelope--they do not contribute to the waterproofing of the building--but instead are plantings that are placed on top of the roof system.
Since neither term is defined, this code change simply chooses "landscaped roof" over "roof garden," as we think landscaping is the more generic term. We believe that between this code change proposal and FS153-18, we have correctly identified every place this change is necessary across the I-codes, based on word searches for forms of "vegetative," "landscape," and "garden." Note the term appears in IECC Section CA103, but it is not being changed by this proposal, as changing it is necessary.

Cost Impact: The code change proposal will not increase or decrease the cost of construction Because this proposal is purely editorial, there is no cost impact.

CE86-19: See highlighted change to Table C402.4

CE86-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, BCAP-IBTS, representing BCAP-IBTS(mguttman@bcapcodes.org); Harry Misuriello, American Council for an Energy-Efficient Economy, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM *U*-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
Vertical fenestration																
U-factor																
Fixed fenestration	0.50		0.50		0.46		0.38		0.38		0.36		0.29		0.29	
Operable fenestration	0.65		0.65		0.60		0.45		0.45		0.43		0.37		0.37	
Entrance doors	1.10		0.83		0.77		0.77		0.77		0.77		0.77		0.77	
SHGC																
Orientation[a]	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N	SEW	N
PF < 0.2	0.25	0.33	0.25	0.33	0.25	0.33	0.36	0.48	0.38	0.51	0.40	0.53	0.45	NR	0.45	N
0.2 ≤ PF < 0.5	0.30	0.37	0.30	0.37	0.30	0.37	0.43	0.53	0.46	0.56	0.48	0.58	NR	NR	NR	NR
PF ≥ 0.5	0.40	0.40	0.40	0.40	0.40	0.40	0.58	0.58	0.61	0.61	0.64	0.64	NR	NR	NR	NR
Skylights																

CLIMATE ZONE	1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7	8
U-factor	~~0.75~~ 0.70	0.65	0.55	0.50	0.50	~~0.50~~ 0.47	~~0.50~~ 0.44	~~0.50~~ 0.41
SHGC	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

NR = No Requirement, PF = Projection Factor.

1. a."N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N." For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.

CE87-19: See highlighted change to Table C402.4. Table was cut off in the Committee Action Hearing Agenda

CE87-19

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Daniel Bresette, Alliance to Save Energy, representing Alliance to Save Energy (dbresette@ase.org); Maureen Guttman, BCAP-IBTS, representing BCAP-IBTS (mguttman@bcapcodes.org); Harry Misuriello, representing American Council for an Energy-Efficient Economy (misuriello@verizon.net)

Revise as follows:

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM *U*-FACTOR AND SHGC REQUIREMENTS

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM *U*-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	1		2		3		4 EXCEPT MARINE		5 AND MARINE 4		6		7		8	
Vertical fenestration																
U-factor																
Fixed fenestration	0.50		0.50		0.46		0.38		0.38		0.36		0.29		0.29	
Operable fenestration	0.65		0.65		0.60		0.45		0.45		0.43		0.37		0.37	
Entrance doors	1.10		0.83		0.77		0.77		0.77		0.77		0.77		0.77	
SHGC																
Orientation[a]	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable	~~SEW~~ Fixed	~~N~~ Operable
PF < 0.2	~~0.25~~ 0.23	~~0.33~~ 0.21	0.25	~~0.33~~ 0.23	0.25	~~0.33~~ 0.23	0.36	~~0.48~~ 0.33	0.38	~~0.51~~ 0.33	~~0.40~~ 0.38	~~0.53~~ 0.34	~~0.45~~ 0.40	~~NR~~ 0.36	~~0.45~~ 0.40	~~NR~~ 0.36
0.2 ≤ PF < 0.5	~~0.30~~ 0.28	~~0.37~~ 0.25	0.30	~~0.37~~ 0.28	0.30	~~0.37~~ 0.28	0.43	~~0.53~~ 0.40	0.46	~~0.56~~ 0.40	~~0.48~~ 0.46	~~0.58~~ 0.41	~~NR~~ 0.48	~~NR~~ 0.43	~~NR~~ 0.48	~~NR~~ 0.43
PF ≥ 0.5	~~0.40~~ 0.37	~~0.40~~ 0.34	0.40	~~0.40~~ 0.37	0.40	~~0.40~~ 0.37	0.58	~~0.58~~ 0.53	0.61	~~0.61~~ 0.53	~~0.64~~ 0.61	~~0.64~~ 0.54	~~NR~~ 0.64	~~NR~~ 0.58	~~NR~~ 0.64	~~NR~~ 0.58
Skylights																

CLIMATE ZONE	1	2	3	4 EXCEPT MARINE	5 AND MARINE 4	6	7	8
U-factor	0.75	0.65	0.55	0.50	0.50	0.50	0.50	0.50
SHGC	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

NR = No Requirement, PF = Projection Factor.

~~a. "N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N." For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.~~

CE103-19 Part I: Replace code change with the following (No change to the reason or cost impact):

CE103-19 Part I

Proponent: Darren Meyers, P.E., International Energy Conservation Consultants LLC, representing Self (dmeyers@ieccode.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2018 International Energy Conservation Code

Revise as follows:

C402.5.3 Rooms containing fuel-burning appliances <u>Combustion and solid-fuel burning appliances</u>. <u>Combustion and solid-fuel burning appliances shall be provided with adequate combustion and ventilation air and installed in accordance with manufacturers' installation instructions and the *International Fuel Gas Code*, NFPA 31, NFPA 211 or other equivalent code approved by the code official.</u> ~~In *Climate Zones* 3 through 8, where combustion air is supplied through openings in an exterior wall to a room or space containing a space-conditioning fuel-burning appliance, one of the following shall apply:~~

~~1. The room or space containing the appliance shall be located outside of the *building thermal envelope*.~~
~~2. The room or space containing the appliance shall be enclosed and isolated from conditioned spaces in-side the building thermal envelope. Such rooms shall comply with all of the following:~~
~~2.1. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be insulated to be not less than equivalent to the insulation requirement of below-grade walls as specified in Table C402.1.3 or C402.1.4.~~
~~2.2. The walls, floors and ceilings that separate the enclosed room or space from conditioned spaces shall be sealed in accordance with Section C402.5.1.1.~~
~~2.3. The doors into the enclosed room or space shall be shall be fully gasketed.~~
~~2.4. Water lines and ducts in the enclosed room or space shall be insulated in accordance with Section C403.~~
~~2.5. Where an air duct supplying combustion air to the enclosed room or space passes through conditioned space, the duct shall be insulated to an *R*-value of not less than R-8.~~

~~**Exception:** Fireplaces and stoves complying with Sections 901 through 905 of the International Mechanical Code, and Section 2111.14 of the International Building Code.~~

Add new text as follows:

C402.5.3.1 Testing. Where atmospherically vented combustion appliances or solid-fuel burning appliances are located inside the pressure boundary of the *building thermal envelope*, the total net exhaust flow of the two largest exhaust fans (not including a summer cooling fan(s) intended to be operated only when windows or other air inlets are open) shall not exceed 15 cfm per 100 ft^2 (75 L/s per 100 m^2) of occupiable space when in operation at full capacity.

Where the designed total net flow exceeds this limit, the net exhaust flow must be reduced by reducing the exhaust flow or providing compensating outdoor air. Gravity or barometric dampers in non-powered exhaust makeup air systems shall not be used to provide compensating outdoor air. Atmospherically-vented combustion appliances do not include direct-vent appliances. Combustion appliances that pass safety testing performed in accordance with BPI-1200, shall be deemed as complying with Section C402.5.3.

Add new standard(s) as follows:

BPI

Building Performance Institute, Inc.
107 Hermes Road, Suite 210
Malta
NY
12020
US

BPI-1200-S-2017: Standard Practice for Basic Analysis of Buildings

Add new text as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy
MA
02169-7471

31-16: Standard for the Installation of Oil-burning Equipment.

211-16: Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances

CE103-19 Part II: Replace code change with the following (No change to the reason or cost impact):

CE103-19 Part II

Proponent: Darren Meyers, P.E., International Energy Conservation Consultants LLC, representing Self (dmeyers@ieccode.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2018 International Energy Conservation Code

Revise as follows:

R402.4.4 (IRC N1102.4.4) ~~Rooms containing fuel-burning appliances~~ Combustion and solid-fuel burning appliances. Combustion and solid-fuel burning appliances shall be provided with adequate combustion and ventilation air and installed in accordance with manufacturers' installation instructions and the *International Fuel Gas Code*, NFPA 31, NFPA 211 or other equivalent code approved by the code official. ~~In *Climate Zones* 3 through 8, where open combustion air ducts provide combustion air to open combustion fuel burning appliances, the appliances and combustion air opening shall be located outside the *building thermal envelope* or enclosed in a room that is isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table R402.1.2, where the walls, floors and ceilings shall meet not less than the *basement wall R*-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section R403. The combustion air duct shall be insulated where it passes through *conditioned space* to an Rvalue of not less than R-8.~~

~~**Exceptions:**~~

1. ~~Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.~~
2. ~~Fireplaces and stoves complying with Section R402.4.2 and Section R1006 of the International Residential Code.~~

Add new text as follows:

R402.4.4.1 (IRC N1102.4.4.1) Testing. Where atmospherically vented combustion appliances or solid-fuel burning appliances are located inside the pressure boundary of the *building thermal envelope*, the total net exhaust flow of the two largest exhaust fans (not including a summer cooling fan(s) intended to be operated only when windows or other air inlets are open) shall not exceed 15 cfm per 100 ft^2 (75 L/s per 100 m^2) of occupiable space when in operation at full capacity.

Where the designed total net flow exceeds this limit, the net exhaust flow must be reduced by reducing the exhaust flow or providing compensating outdoor air. Gravity or barometric dampers in non-powered exhaust makeup air systems shall not be used to provide compensating outdoor air. Atmospherically-vented combustion appliances do not include direct-vent appliances. Combustion appliances that pass safety testing performed in accordance with BPI-1200-S shall be deemed as complying with Section R402.4.4.

Add new standard(s) as follows:

BPI

Building Performance Institute, Inc.
107 Hermes Road, Suite 210
Malta
NY
12020
US

BPI-1200-S-2017: Standard Practice for Basic Analysis of Buildings

Add new text as follows:

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy
MA
02169-7471

31-16: Standard for the Installation of Oil-burning Equipment.

211-16: Standard for Chimneys, Fireplaces, Vents and Solid Fuel-burning Appliances

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CE115-19 Part I: Replace code change with the following (No change to the reason or cost impact):

CE115-19 Part I

Proponent: Steven Rosenstock, Edison Electric Institute, representing Edison Electric Institute (srosenstock@eei.org).

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2018 International Energy Conservation Code

Revise as follows:

C403.4.1.1 Heat pump ~~supplementary~~ supplemental heat (Mandatory).
Heat pumps having ~~supplementary~~ supplemental electric resistance heat shall have controls that ~~,~~ ~~except during defrost,~~ prevent ~~supplementary~~ supplemental heat operation where the heat pump vapor compression cycle can provide the ~~heating load.~~necessary heating to satisfy the thermostat control.

Exceptions:

1. Defrost operation.
2. Vapor compression cycle malfunction.
3. Thermostat malfunction

CE117-19: Replace the proposal with the following (No change to the reason or cost impact):

CE117-19

Proponent: donald sivigny, State of MN, representing State of MN and Association of Minnesota Building Officials (don.sivigny@state.mn.us)

2018 International Energy Conservation Code

Revise as follows:

C403.4.1.4 Heated or cooled vestibules (Mandatory). The heating ~~system~~ for heated vestibules and air curtains with integral heating shall be provided with controls ~~configured~~ to shut off the source of heating when the outdoor air temperature is greater than ~~45°F (7°C)~~ 60°F (16°C). Vestibule heating and cooling systems shall be controlled by a thermostat located in the vestibule configured to limit heating to a temperature not greater than ~~60°F (16°C)~~ 68°F (20°C) and cooling to a temperature not less than 85°F (29°C).

Exception: Control of heating or cooling provided by site-recovered energy or transfer air that would otherwise be exhausted.

CE134-19: Correction to section headers. Section and Table are being deleted, they should not show as New.

CE134-19

IECC: C403.7.5 ~~(New)~~, TABLE C403.7.5 ~~(New)~~

Proponent: Guy McMann, Jefferson County, Colorado, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

CE149-19: Correction to section numbers. Proponent name did not appear in the CAH.

CE149-19

Proponent: Amanda Hickman, representing AHRI (amanda@thehickmangroup.com)

CE150-19: Corrected reason statement for Part I & Part II

CE150-19

Proponent: Howard Ahern, representing self (howard.ahern@airexmfg.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason: Part I of this proposal will clarify the intent of Section C403.11.3.1. Part II of this proposal will clarify the intent of Section R403.4.1. The intent of these sections is not only protection of pipe insulation from weather but to insure the insulations thermal conductivity energy savings integrity last the life of the mechanical system as per the intent of the code . In order to remove the opportunity for misunderstanding so that the code has its intended result the term “equipment maintenance” must be clarified.

The intent is in the original proponents reason statement of this requirement EC207-09/10 which stated this was originally from the ASHRAE 90.1 standard to Harmonize the IECC with ASHRAE 90.1 for the 2012 code the reason statement also stated -“ All AC units require periodic maintenance. The frequency varies with how hard the unit operates, exterior temperature, preventive maintenance program, and many others. In every occasion, every maintenance provides an excuse for the Freon line insulation to be touched and removed.” The intent is clear that the protection be removable and independent of the pipe insulation for maintenance without damaging the pipe insulation.

Removing protection without damaging the insulation is stated in EC207-09/10 “Adhesives Tape is not permitted as it will limit maintenance and damage insulations permeability characteristics. Removal of tape damages the integrity of the original insulation into pieces, specially, if the insulation has reached thermo set state.

Protective covering must also protect from physical damage so if the protection covering does get damaged from stepping on it, dropping tools on it, birds, lawn trimmers etc.it can be replaced keeping the insulations thermal conductivity integrity and insuring the insulation system last the life of the mechanical system and avoiding the costly replacement of the insulation.

2012 & 2018 IECC Code and commentary both state that Equipment maintenance also include protection from physical damage to the pipe insulation.

The code section also requires the removal protection to shield from solar radiation that can cause degradation on of the insulation. This sometime get confused with UV protection that is under damage from “sunlight”. The additional requirement to shield against solar radiation that is more than just UV, solar radiation also includes heat. Heat is a major factor in the degradation of insulation .UV testing while a good start can be unreliable as it depends on product placement.

Removable protection also allows less costly maintenance and replacement of any damaged insulation.

Updated April 2, 2019

CE150-19: Withdrawn by Proponent

CE154-19 Withdrawn

CE159-19: Corrected reason statement for Part I & Part II

CE159-19

Proponent: Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:
Part I -This code change clarifies the requirements for heated water circulation and demand recirculation systems. Section C404.7 - 'Demand recirculation water systems' is moved and renumbered as a subsection to C404.6.1 - 'Circulation systems' because a demand recirculation is a type of 'circulation system' with specific demand-initiated control requirements.

The temperature limit for cold-water return piping, item 2 of 'Demand recirculation water systems' is relocated to the body of section C404.6.1 (circulation systems) because this provision pertains to all heated water circulation systems that use cold-water piping as a return to the water-heating equipment.

This code change clarifies the intent of this section for the energy efficient delivery of hot water by correlating the existing provisions for circulation and demand recirculation water systems. These provisions are only applicable when heated water circulation and demand recirculation systems are installed.

Part II - This code change clarifies the requirements for heated water circulation and demand recirculation systems. Section R403.5.2 - 'Demand recirculation water systems' is moved and renumbered as a subsection to R403.5.1.1 - 'Circulation systems' because demand recirculation is a type of 'circulation system' with specific demand-initiated control requirements.

The temperature limit for cold-water return piping, item 2 of 'Demand recirculation water systems' is relocated to the body of section R403.5.1.1 (circulation systems) because this provision pertains to all heated water circulation systems that use cold-water piping as a return to the water-heating equipment.

This code change clarifies the intent of this section for the energy efficient delivery of hot water by correlating the existing provisions for circulation and demand recirculation water systems. These provisions are only applicable when heated water circulation and demand recirculation systems are installed.

CE160-19 Part I: Banner added to explain what committee will hear the code change

CE160-19 Part I

Proponent: Jennifer Hatfield, representing Association of Pool & Spa Professionals (jen@jhatfieldandassociates.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

CE169-19: Item 10 should show completely underlined.

CE169-19

Proponent: Jack Bailey, representing International Association of Lighting Designers (jbailey@oneluxstudio.com); Glenn Heinmiller, Lam Partners, representing International Association of Lighting Designers (glenn@lampartners.com)

2018 International Energy Conservation Code

Revise as follows:

C405.2.1 Occupant sensor controls. Occupant *sensor controls* shall be installed to control lights in the following space types:

1. Classrooms/lecture/training rooms.
2. Conference/meeting/multipurpose rooms.
3. Copy/print rooms.
4. Lounges/breakrooms.
5. Enclosed offices.
6. Open plan office areas.
7. Restrooms.
8. Storage rooms.
9. Locker rooms.
10. Corridors
11. Warehouse storage areas
12. ~~10.~~ Other spaces 300 square feet (28 m^2) or less that are enclosed by floor-to-ceiling height partitions.

CE173-19: See highlighted change

CE173-19

Proponent: Harold Jepsen, representing National Electrical Manufacturers Association (harold.jepsen@legrand.us)

Revise as follows:

C405.2.1.3 Occupant sensor control function in open plan office areas. Occupant sensor controls in open plan office spaces less than 300 square feet (28 m^2) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces shall comply with all of the following:

1. The controls shall be configured so that general lighting can be controlled separately in control zones with floor areas not greater than 600 square feet (55 m^2) within the open plan office space.
2. General lighting in each control zone shall be allowed to automatically turn on upon occupancy within the control zone. General lighting in other unoccupied zones within the open plan office space shall be allowed to turn on to no more than 20 percent of full power or remain unaffected.

3. The controls shall automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space. Controls shall automatically return lighting to their previous settings if occupancy is detected within 30 seconds of lights being turned off.
4. General lighting in each control zone shall tum off or uniformly reduce lighting power to no more than 20 percent of full power within 20 minutes after all occupants have left the
~~3. The controls shall be configured so that general lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power in a reasonably uniform illumination pattern within 20 minutes of all occupants leaving that~~ control zone. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.
~~4~~5. ~~The~~ For g*eneral lighting* also served by *daylight responsive controls* as required by Section C405.2.3, the occupant sensor control and the *daylight responsive controls* shall be configured ~~such that any daylight responsive control will activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.~~ so that power does not exceed the lesser of: the allowed power in Section C405.2.3.1 and the allowed power in Items 2 through 4 of this section.

Updated April 17, 2019

CE195-19: Withdrawn by Proponent

CE195-19 Withdrawn

CE215-19: Highlighted text has been added to Section C405.10.1

CE215-19

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association (mar_williams@nema.org)

C405.10.1 Electrical energy metering. For electrical energy, including all electrical energy supplied to the building and its associated site, including but not limited to site lighting, parking, recreational facilities, and other areas that serve the building and its occupants, meters or other measurement devices shall be provided to collect energy consumption data for each end-use category required by Section C405.10.2.

Updated 4/17/2019

CE216-19: Replace reason statement with the following (no change to the code sections):

CE216-19

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association

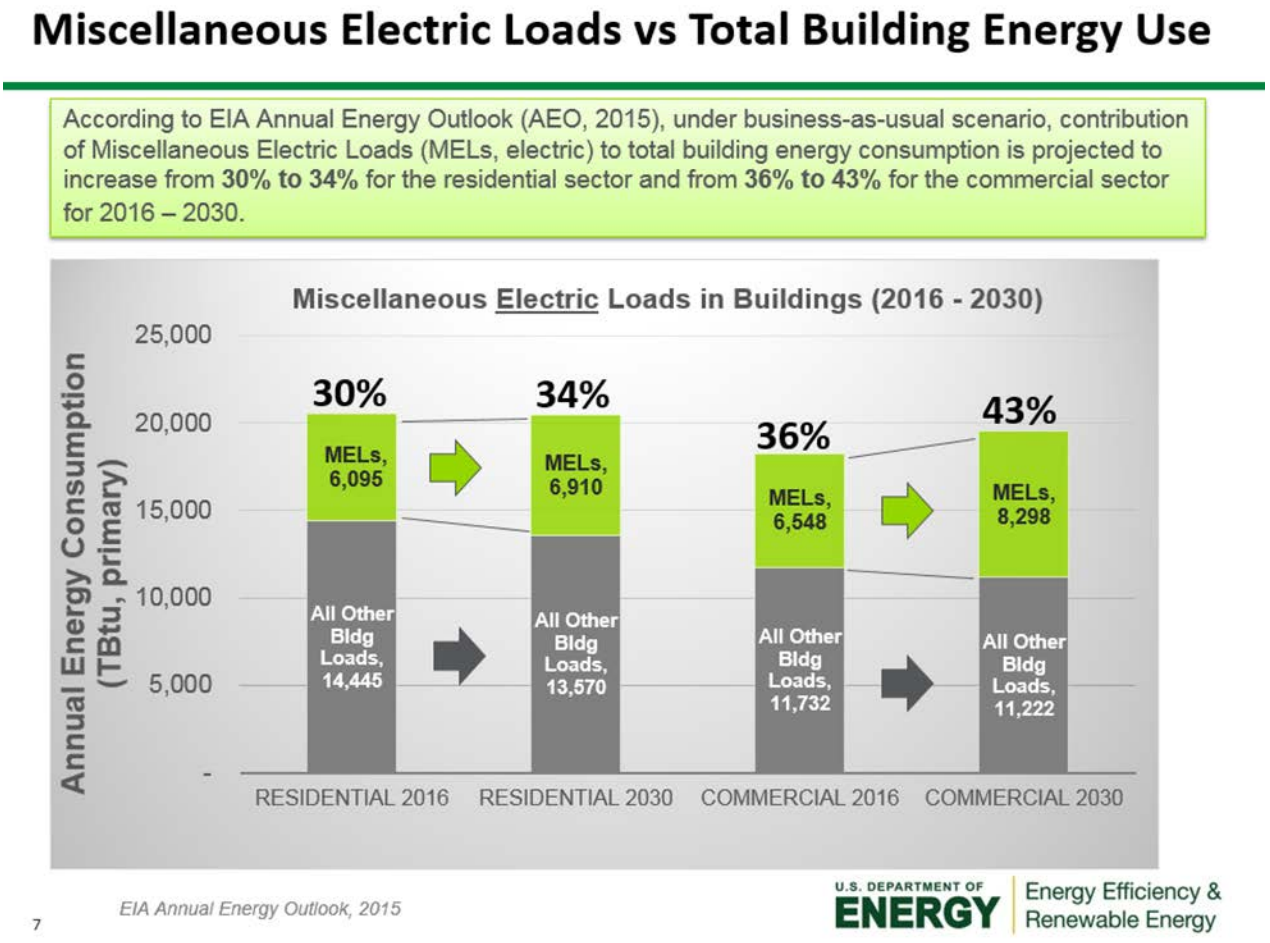
Reason:
This proposal will:

1. Increase building energy efficiency

2. Offer a well-studied, cost effective efficiency measure
3. Maintain building occupant's safe usability
4. Keep enforceability simple
5. Align with other energy efficiency codes, increasing design compliance.

Although commercial buildings continue to decrease their energy use through more efficient lighting, mechanical, and domestic water systems, the Miscellaneous Electrical Loads (MELs) energy segment continues to rise. More and more electrical power consuming devices are being plugged into building electrical systems. Some, such as fans, space heaters, printers, monitors, plug in lamps are left on, when spaces are unoccupied. Other devices may be left plugged in and continue to draw power even when inactive or in standby modes. This wastes energy and is counter to the energy efficiency aim of the IECC.

Some jurisdictions which adopt the IECC for their commercial buildings, like Florida and Washington, have amended the IECC to include automatic receptacle control, thereby addressing the growing energy consumption concern of these loads. For more than eight years, other energy efficiency codes have included automatic receptacle control provisions to reduce the wasted energy. Yet, the IECC lags behind offering no viable solution to the growing receptacle and miscellaneous loads on commercial building electrical systems. The Annual Energy Outlook of 2015 from the US EIA, indicate that these load categories will grow from 36% of a commercial buildings energy use, to 43% over the next 15 years.



This provision simply assures receptacle loads that are not needed when building occupants leave high receptacle load use areas, are automatically turned off, saving the energy that would otherwise be wasted. It requires that controlled receptacles clearly be marked as required by NFPA 70, to

eliminate user confusion of proper use, and provides good practice exceptions where controlling receptacles would endanger safety and security, or areas of continuous operation.

Expressed safety concerns where extensive use of extension cords and plug strips would be used are unfounded. There are no documented studies validating this problem exists. The proposed language requires either a split duplex receptacle with a controlled or uncontrolled receptacle in the same device, or an uncontrolled receptacle be located no more than 12 inches from a controlled receptacle. This provides occupants in an automatic receptacle-controlled space, clear access to both label marked controlled receptacles and uncontrolled receptacles.

Although there are no requirements for receptacle density in commercial buildings, a design professional will ensure there is an appropriate distribution of receptacles to effectively accomplish the mission of the building. There's no evidence that the distribution of receptacle outlets and controlling some of them has any adverse impact on the utility of this requirement.

Enforceability of this provision is straight forward for building departments and their inspectors. Construction drawings indicate which receptacles are controlled and which are uncontrolled. Onsite inspection will clearly show complying labelled receptacles and operation is easily varied with the shut-off controls already in place with the lighting system.

There have been a considerable number of studies over the years that share the viability and cost effectiveness of automatic receptacle control. Some noted here.

1. One study demonstrated effectiveness (e.g. Zhang2012) with simply payback on this type of equipment between 1.5 and 9 years for small and large offices. This considers the most comprehensive information on office plug load types, installation densities, usage patterns, and power states based on field surveys and monitoring (Kawamoto 2000, 2001; Moorefield, Frazer & Bendt 2011; Roberson 2002, 2004; Roth 2002, 2004; Sanchez 2007; Webber 2001, 2005).
2. A CASE initiative study for CA Title 24-2013 found that smaller office buildings (10,000 sqft) had an annual electrical savings of 4,900 kwh/year and a demand savings of 1.97 kW. Based on installed costs and utilization of lighting control system elements already installed. The simple payback was 4.2 years. For larger office buildings (175,000 sqft) the annual electrical savings were 107,000 kwh/year and a demand savings of 23.6 kW for a simple payback of 2.4 years.
3 .A GSA Green Proving Ground Program study conducted in 8 buildings with monitored receptacle control through market available plug strips found "Results underscored the effectiveness of schedule-based functionality, which reduce plug loads at workstations by 26%, even though advanced computer power management was already in place, and nearly 50% in printer room and kitchens." In the study buildings, receptacle loads averaged 21% of building energy use and monitored more than 295 devices over three different test periods to validate the findings. It found payback through timer scheduled control of kitchens of 0.7 years, printer rooms of 1.1 years and miscellaneous devices in 4.1 years. At workstations, the payback was 7.8 years.
4. A study done on "Office Space Plug Load Profiles and Energy Savings Interventions" at the University of Idaho and presented at the ACEEE summer Study in 2012 found that average savings of 0.60 kWh/SF Yr. with plug strip control interventions. This study provided guidance for utility programs to assist with development of plug load efficiency measures and was based on a more detailed report, "Plug Load Profiles" (Acker, B. et. al. 2012).
5. The DOE Better Buildings program issued a December 2015 "Decision Guides for Plug and Process Loads Controls" to help educate and guide decision processes for effective receptacle-based load control. It highlights that "Plug and Process Loads" account for 33% of the total energy consumed by commercial buildings. It sites seven decision strategies including that of Integrated plug load controls with other building systems as one of the largest for energy savings across most building types for whole-building retrofit and new construction categories.

6. A study performed “Advancing the Last Frontier: Reduction of Commercial Plug Loads” presented at the ACEEE summer study of 2016, indicated field study results demonstrating savings of 19% when deploying plug in control strategies in office workstation environments.

Updated 4/17/2019

CE218-19: Replace code change with the following (no change to the reason or cost impact):

CE218-19

Proponent: Eric Makela, New Buildings Institute, representing Northwest Energy Codes Group (ericM@newbuildings.org)

2018 International Energy Conservation Code

Revise as follows:

SECTION C406
ADDITIONAL EFFICIENCY REQUIREMENTS ~~PACKAGE OPTIONS~~

C406.1 ~~Requirements~~ Additional energy efficiency credit requirements. ~~Buildings shall comply~~ New buildings shall achieve a total of 10 credits from Tables C406.1(1) through C406.1(5) where the table is selected based on the use group of the building. Where a building contains multiple use groups, credits from each use group shall be weighted by floor area of each group to determine the weighted average building credit. Alternatively, credits shall be calculated in accordance with the relevant subsection of C406. Credits from the tables or calculation shall be achieved where a building complies with one or more of the following:

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.
7. Enhanced envelope performance in accordance with Section C406.8.
8. Reduced air infiltration in accordance with Section C406.9

Add new text as follows:

TABLE C406.1(1)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP B OCCUPANCY

Sub-section / Climate Zone:	**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**5A**	**5B**	**5C**	**6 A**	**6 B**	**7**	**8**
C406 .2.1: 5% Heating Eff Imprv.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	NA	NA	1	1	NA	1
C406 .2.2: 5% Cooling Eff Imprv.	6	6	5	5	4	4	3	3	3	2	2	2	1	2	2	2	1
C406 .2.3: 10 % Heating Eff Imprv.	NA	NA	NA	NA	NA	NA	NA	1	NA	NA	2	1	1	2	2	NA	1

C406 .2.4: 10 % Cooling Eff Imprv.	11	12	10	9	7	7	6	5	6	4	4	5	3	4	3	3	3
C406 .3: Reduced Light Power	9	8	9	9	9	9	10	8	9	9	7	8	8	6	7	7	6
C406 .4: Enh. Digital Light Ctrl	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1
C406 .5.1: On-site Renewable Egy.	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
C406 .6 : Dedicated OA Sys (DOAS)	4	4	4	4	4	3	2	5	3	2	5	3	2	7	4	5	3
C406 .7.2: Recovered/Renew SWH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .7.3: Eff fossil fuel SWH [b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .7.4: Heat Pump SWH [b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .8: Enhanced Envelope Perf	1	4	2	4	4	3	NA	7	4	5	10	7	6	11	10	14	16
C406 .9: Reduced Air Infiltration	2	1	1	2	4	1	NA	8	2	3	11	4	1	15	8	11	6

TABLE C406.1(2)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP R AND I OCCUPANCIES

Sub-section / Climate Zone:	**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**5A**	**5B**	**5C**	**6 A**	**6 B**	**7**	**8**
C406 .2.1: 5% Heating Eff Imprv.	NA	NA	NA	NA	1	NA	NA	1	NA	1	1	1	1	2	1	2	2
C406 .2.2: 5% Cooling Eff Imprv.	3	3	2	2	1	1	1	1	1	NA	1	1	NA	1	1	1	NA
C406 .2.3: 10 % Heating Eff Imprv.	NA	NA	NA	NA	1	NA	NA	1	1	1	2	2	1	3	2	3	4
C406 .2.4: 10 % Cooling Eff Imprv.	5	5	4	3	2	3	1	2	2	1	1	1	1	1	1	1	1
C406 .3: Reduced Light Power	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2
C406 .4: Enh. Digital Light Ctrl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .5.1: On-site Renewable Egy.	8	8	8	8	7	8	8	7	7	7	7	7	7	7	7	7	7
C406 .6 : Dedicated OA Sys (DOAS)	3	4	3	3	4	2	NA	6	3	4	8	5	5	10	7	11	12
C406 .7.2: Recovered/Renew SWH	10	9	11	10	13	12	15	14	14	15	14	14	16	14	15	15	15

C406 .7.3: Eff fossil fuel SWH	5	5	6	6	8	7	8	8	8	9	9	9	10	10	9	10	11
C406 .7.4: Heat Pump SWH	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
C406 .8: Enhanced Envelope Perf	3	6	3	5	4	4	1	4	3	3	4	5	3	5	4	6	6
C406 .9: Reduced Air Infiltration	6	5	3	11	6	4	NA	7	3	3	9	5	1	13	6	8	3

TABLE C406.1(3)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP E OCCUPANCIES

Sub-section / Climate Zone:	**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**5A**	**5B**	**5C**	**6A**	**6B**	**7**	**8**
C406 .2.1: 5% Heating Eff Imprv.	NA	NA	NA	NA	1	1	1	1	1	2	1	2	1	2	2	3	4
C406 .2.2: 5% Cooling Eff Imprv.	4	4	3	3	2	2	2	2	1	1	1	1	NA	1	1	1	NA
C406 .2.3: 10 % Heating Eff Imprv.	NA	NA	NA	1	1	1	1	2	3	4	3	4	3	4	3	5	7
C406 .2.4: 10 % Cooling Eff Imprv.	7	8	7	6	5	4	3	4	3	1	2	2	1	2	2	2	1
C406 .3: Reduced Light Power	8	8	8	9	8	9	9	8	9	9	8	9	8	7	8	7	7
C406 .4: Enh. Digital Light Ctrl	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	1
C406 .5.1: On-site Renewable Egy.	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5
C406 .6 : Dedicated OA Sys (DOAS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .7.2: Recovered/Renew SWH[a]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C406 .7.3: Eff fossil fuel SWH [a]	NA	1	1	1	1	1	1	2	2	3	2	3	2	3	3	3	5
C406 .7.4: Heat Pump SWH [a]	NA	NA	NA	NA	NA	NA	NA	1	NA	NA	1	1	NA	1	1	1	1
C406 .8: Enhanced Envelope Perf	3	7	3	4	2	4	1	1	3	1	2	3	NA	4	3	6	9
C406 .9: Reduced Air Infiltration	1	1	1	2	NA	NA	NA	NA	NA	NA	1	NA	NA	4	1	4	3

y Efficiency Credits for Group E Occupancies
a. For schools with showers or full service kitchens

TABLE C406.1(4)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR GROUP M OCCUPANCY

Sub-section / Climate Zone:	**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**5A**	**5B**	**5C**	**6 A**	**6 B**	**7**	**8**
C406 .2.1: 5% Heating Eff Imprv.	NA	NA	NA	NA	1	1	NA	1	1	2	2	2	2	3	2	3	4
C406 .2.2: 5% Cooling Eff Imprv.	5	6	4	4	3	3	1	2	2	1	1	2	NA	1	1	1	NA
C406 .2.3: 10 % Heating Eff Imprv.	NA	NA	NA	1	1	1	1	2	2	4	3	4	5	5	3	6	8
C406 .2.4: 10 % Cooling Eff Imprv.	9	12	9	8	6	6	3	4	4	1	2	3	NA	2	2	2	1
C406 .3: Reduced Light Power	13	13	15	14	16	14	17	15	15	14	12	14	14	16	16	14	12
C406 .4: Enh. Digital Light Ctrl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .5.1: On-site Renewable Egy.	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	6
C406 .6 : Dedicated OA Sys (DOAS)	3	4	3	3	3	3	1	3	2	2	2	3	2	4	3	4	4
C406 .7.2: Recovered/Renew SWH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .7.3: Eff fossil fuel SWH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .7.4: Heat Pump SWH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
C406 .8: Enhanced Envelope Perf	4	6	3	4	3	3	1	6	4	4	4	5	4	6	5	8	9
C406 .9: Reduced Air Infiltration	1	1	1	2	1	1	NA	3	1	1	3	2	1	7	3	6	3

TABLE C406.1(5)
ADDITIONAL ENERGY EFFICIENCY CREDITS FOR OTHER[A] OCCUPANCIES

Sub-section / Climate Zone:	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6 A	6 B	7	8
C406 .2.1: 5% Heating Eff Imprv.	NA	NA	NA	NA	1	1	1	1	1	2	1	2	1	2	2	3	3
C406 .2.2: 5% Cooling Eff Imprv.	5	5	4	4	3	3	2	2	2	1	1	2	1	1	1	1	1
C406 .2.3: 10 % Heating Eff Imprv.	NA	NA	NA	1	1	1	1	2	2	3	3	3	3	4	3	5	5
C406 .2.4: 10 % Cooling Eff Imprv.	8	9	8	7	5	5	3	4	4	2	2	3	2	2	2	2	2
C406 .3: Reduced Light Power	8	8	9	9	9	9	10	8	9	9	7	8	8	8	8	8	7

C406 .4: Enh. Digital Light Ctrl	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	1
C406 .5.1: On-site Renewable Egy.	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7
C406 .6 : Dedicated OA Sys (DOAS)	3	4	3	3	4	3	2	5	3	3	5	4	3	7	5	7	6
C406 .7.2: Recovered/Renew SWH [b]	10	9	11	10	13	12	15	14	14	15	14	14	16	14	15	15	15
C406 .7.3: Eff fossil fuel SWH [b]	5	5	6	6	8	7	8	8	8	9	9	9	10	10	9	10	11
C406 .7.4: Heat Pump SWH [b]	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
C406 .8: Enhanced Envelope Perf	3	6	3	4	3	4	1	5	4	3	5	5	4	7	6	9	10
C406 .9: Reduced Air Infiltration	3	2	2	4	4	2	NA	6	2	2	6	4	1	10	5	7	4

a. Other occupancy groups include all Groups except for Groups B, R, I, E, and M
b. For occupancy groups listed in C406.7.1

Revise as follows:

C406.1.1 Tenant spaces. Tenant spaces shall comply with sufficient options from Tables C406.1(1) through C406.1(5) to achieve a minimum number of 5 credits, where credits are selected from Section C406.2, C406.3, C406.4, C406.6 or C406.7. ~~Alternatively~~ Where the entire building complies using credits from Section C406.5, C406.8 or C406.9, tenant spaces within the building shall be deemed to comply with ~~Section C406.5 where the entire building is in compliance .~~this section.

> **Exception:** Previously occupied tenant spaces that comply with this code in accordance with Section C501.

C406.2 More efficient HVAC equipment performance. Equipment shall exceed the minimum efficiency requirements listed in Tables C403.3.2(1) through C403.3.2(~~7) by 10 percent, in addition to the requirements of Section C403. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 10 percent.~~ 9) and *Variable refrigerant flow systems* ~~shall exceed~~ listed in the energy efficiency provisions of ~~ANSI/~~ ASHRAE/IESNA 90.1 ~~by 10 percent.~~ in accordance with Sections C406.2.1, C406.2, C406.2.3 or C406.4. Equipment shall also meet applicable requirements of Section C403. Energy efficiency credits for heating shall be selected from C406.2.1 or C406.2.3 and energy efficiency credits for cooling shall be selected from C406.2.2 or C406.2.4. Selected credits shall include a heating or cooling energy efficiency credit or both. Equipment not listed in Tables C403.3.2(1) through C403.3.2(~~7)~~ 9) and *Variable refrigerant flow systems* not listed in the energy efficiency provisions of ASHRAE/IESNA 90.1 shall be limited to 10 percent of the total building system capacity for heating equipment where selecting Section C406.2.1 or C406.2.3 and cooling equipment where selecting Section C406.2.2 or C406.2.4.

Add new text as follows:

C406.2.1 Five percent heating efficiency improvement. Equipment shall exceed the minimum heating efficiency requirements by 5 percent.

C406.2.2 Five percent cooling efficiency improvement. Equipment shall exceed the minimum cooling and heat rejection efficiency requirements by 5 percent. Where multiple cooling performance

requirements are provided, the equipment shall exceed the annual energy requirement, including IEER, SEER, and IPLV.

C406.2.3 Ten percent heating efficiency improvement. Equipment shall exceed the minimum heating efficiency requirements by 10 percent.

C406.2.4 Ten percent cooling efficiency improvement. Equipment shall exceed the minimum cooling and heat rejection efficiency requirements by 10 percent. Where multiple cooling performance requirements are provided, the equipment shall exceed the annual energy requirement, including IEER, SEER, and IPLV.

Revise as follows:

C406.5 On-site renewable energy. Buildings shall comply with Section C406.5.1 or C406.5.2. ~~The total minimum ratings of on-site renewable energy systems shall be one of the following:~~

1. ~~Not less than 1.71 Btu/h per square foot (5.4 W/m^2) or 0.50 watts per square foot (5.4 W/m^2) of conditioned floor area.~~
2. ~~Not less than 3 percent of the energy used within the building for building mechanical and service water heating equipment and lighting regulated in Chapter 4.~~

Add new text as follows:

C406.5.1 Basic renewable credit. The total minimum ratings of on-site renewable energy systems not including systems used for credits under Sections C406.7.2, shall be one of the following:

1. Not less than 0.86 Btu/h per square foot (2.7 W/m^2) or 0.25 watts per square foot (2.7 W/m^2) of conditioned floor area.
2. Not less than 2 percent of the annual energy used within the building for building mechanical and service water heating equipment and lighting regulated in Chapter 4.

C406.5.2 Enhanced Renewable Credits. Where the total minimum ratings of on-site renewable energy systems exceeds the rating in C406 .5.1(1), additional energy efficiency credits shall be determined based on Equation 4-13, rounded to the nearest whole number.

$AEEC_{RRa} = AEEC_{2.5} \times RRa / RR_1$ (Equation 4-13)
Where:
$AEEC_{RRa}$ = C406 .5.2 additional energy efficiency credits
RRa = actual total minimum ratings of *on-site renewable energy* systems in Btu/h, watts per square foot or W/m^2)
RR1 = minimum ratings of *on-site renewable energy* systems required by C406 .5.1(1) in Btu/h, watts per square foot or W/m^2)
$AEEC_{2.5}$ = C406 .5.1 credits from Tables C406 .1(1) through C406 .1(5)

C406.7 Reduced energy use in service water heating. Buildings shall comply with Section C406.7.1 and Section C406.7.2, C406.7.3 or C406.7.4.

Revise as follows:

~~**C406.7**~~ **C406.7.1** ~~**Reduced energy use in service water heating**~~ **Building Type.** ~~Buildings shall be of the following types to use this compliance method~~ To qualify for this credit, the building shall contain one of the following use groups and the additional energy efficiency credit shall be prorated by conditioned floor area of the portion of the building comprised of the following use groups:

1. *Group R*-1: Boarding houses, hotels or motels.
2. Group I-2: Hospitals, psychiatric hospitals and nursing homes.
3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas.
4. Group F: Laundries.
5. *Group R*-2.
6. Group A-3: Health clubs and spas.
7. Group E: Schools with full-service kitchens or locker rooms with showers
8. Buildings showing a service hot water load of 10 percent or more of total building energy loads, as shown with an energy analysis as described in Section C407.

~~**C406.7.1**~~ **C406.7.2** ~~**Load fraction**~~ **Recovered or renewable water heating.** The building service water-heating system shall have one or more of the following that are sized to provide not less than ~~60~~ 30 percent of the building€™s annual hot water requirements, or sized to provide ~~100~~ 70 percent of the building€™s annual hot water requirements if the building ~~shall otherwise~~ is required to comply with Section C403.9.5:

1. Waste heat recovery from service hot water, heat-recovery chillers, building equipment, or process equipment.
2. *On-site renewable energy* water-heating systems.

Add new text as follows:

C406.7.3 Efficient fossil fuel water heater. The combined input-capacity-weighted-average equipment rating of all fossil fuel water heating equipment in the building shall be not less than 95% Et or 0 .95 EF. This option shall receive only half the listed credits for buildings required to comply with C404.2.1.

C406.7.4 Heat pump water heater. Where electric resistance water heaters are allowed, all service hot water system heating requirements shall be met using heat pump technology with a combined input-capacity-weighted-average EF of 3.0 . Air-source heat pump water heaters shall not draw conditioned air from within the building, except exhaust air that would otherwise be exhausted to the exterior.

CE226-19: Add new Section C406.7 to the code change proposal. Remainder of code change is unchanged

CE226-19

Proponent: Louis Starr (lstarr@neea.org)

Add new text as follows:

C406.7 Reduced energy use in service water heating. Buildings shall comply with Sections C406.7.1 and either C406 .7.2, C406 .7.3 or C406 .7.4.

CE229-19: Add new Section C406.7 to the code change proposal. Remainder of code change is unchanged

CE229-19

Proponent: Jonathan McHugh, representing McHugh Energy Consultants Inc. (jon@mchughenergy.com)

Add new text as follows:

C406.7 Reduced energy use in service water heating. Buildings shall comply with Sections C406.7.1 and either C406 .7.2, C406 .7.3 or C406 .7.4.

CE232-19: Add new Section C406.7 to the code change proposal. Remainder of code change is unchanged

CE232-19

Proponent: Sean Denniston, representing New Buildings Institute (sean@newbuildings.org)

Add new text as follows:

C406.7 Reduced energy use in service water heating. Buildings shall comply with Sections C406.7.1 and either C406 .7.2, C406 .7.3 or C406 .7.4.

Updated 4/17/2019

CE233-19: Replace reason statement with the following (no change to the code sections):

CE233-19

Proponent: Harold Jepsen, representing National Electrical Manufacturers Association (harold.jepsen@legrand.us)

Reason: This proposal will:

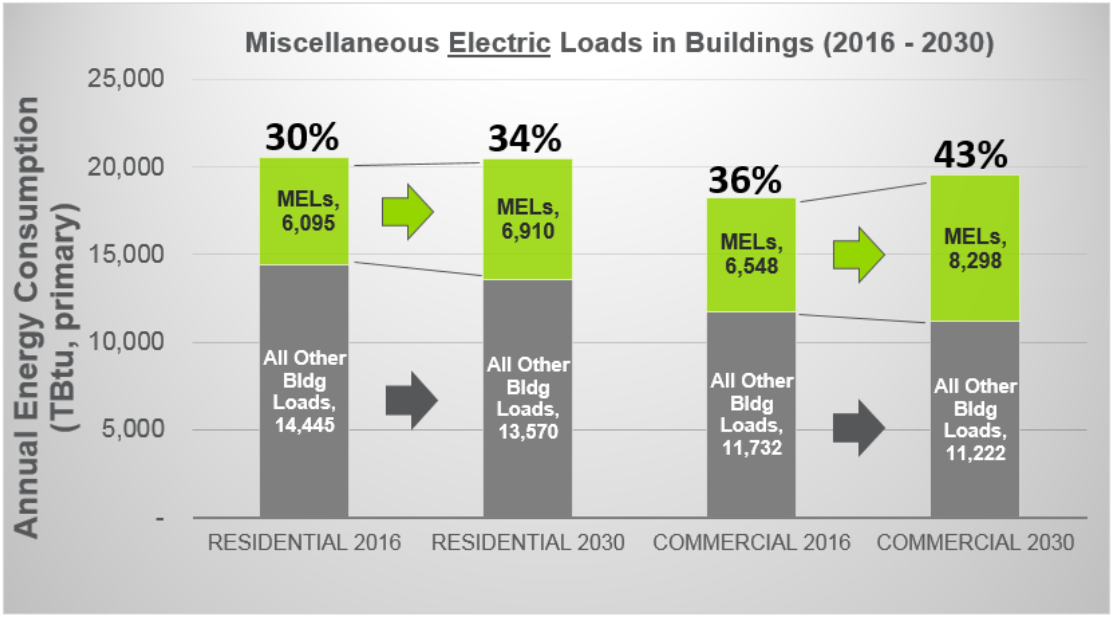
1. Increase building energy efficiency
2. Offer a well-studied, cost effective efficiency measure
3. Maintain building occupant's safe usability
4. Keep enforceability simple
5. Align with other energy efficiency codes, increasing design compliance

Although commercial buildings continue to decrease their energy use through more efficient lighting, mechanical, and domestic water systems, the Miscellaneous Electrical Loads (MELs) energy segment continues to rise. More and more electrical power consuming devices are being plugged into building electrical systems. Some, such as fans, space heaters, printers, monitors, plug in lamps are left on, when spaces are unoccupied. Other devices may be left plugged in and continue to draw power even when inactive or in standby modes. This wastes energy and is counter to the energy efficiency aim of the IECC.

Some jurisdictions which adopt the IECC for their commercial buildings, like Florida and Washington, have amended the IECC to include automatic receptacle control, thereby addressing the growing energy consumption concern of these loads. For more than eight years, other energy efficiency codes have included automatic receptacle control provisions to reduce the wasted energy. Yet, the IECC lags behind offering no viable solution to the growing receptacle and miscellaneous loads on commercial building electrical systems. The Annual Energy Outlook of 2015 from the US EIA, indicate that these load categories will grow from 36% of a commercial buildings energy use, to 43% over the next 15 years.

Miscellaneous Electric Loads vs Total Building Energy Use

According to EIA Annual Energy Outlook (AEO, 2015), under business-as-usual scenario, contribution of Miscellaneous Electric Loads (MELs, electric) to total building energy consumption is projected to increase from **30% to 34%** for the residential sector and from **36% to 43%** for the commercial sector for 2016 – 2030.



EIA Annual Energy Outlook, 2015

7

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

This provision simply assures receptacle loads that are not needed when building occupants leave high receptacle load use areas, are automatically turned off, saving the energy that would otherwise be wasted. It requires that controlled receptacles clearly be marked as required by NFPA 70, to eliminate user confusion of proper use, and provides good practice exceptions where controlling receptacles would endanger safety and security, or areas of continuous operation.

Expressed safety concerns where extensive use of extension cords and plug strips would be used are unfounded. There are no documented studies validating this problem exists. The proposed language requires either a split duplex receptacle with a controlled or uncontrolled receptacle in the same device, or an uncontrolled receptacle be located no more than 12 inches from a controlled receptacle. This provides occupants in an automatic receptacle-controlled space, clear access to both label marked controlled receptacles and uncontrolled receptacles.

Although there are no requirements for receptacle density in commercial buildings, a design professional will ensure there is an appropriate distribution of receptacles to effectively accomplish

the mission of the building. There's no evidence that the distribution of receptacle outlets and controlling some of them has any adverse impact on the utility of this requirement.

Enforceability of this provision is straight forward for building departments and their inspectors. Construction drawings indicate which receptacles are controlled and which are uncontrolled. Onsite inspection will clearly show complying labelled receptacles and operation is easily varied with the shut-off controls already in place with the lighting system.

There have been a considerable number of studies over the years that share the viability and cost effectiveness of automatic receptacle control. Some noted here.

1. One study demonstrated effectiveness (e.g. Zhang2012) with simply payback on this type of equipment between 1.5 and 9 years for small and large offices. This considers the most comprehensive information on office plug load types, installation densities, usage patterns, and power states based on field surveys and monitoring (Kawamoto 2000, 2001; Moorefield, Frazer & Bendt 2011; Roberson 2002, 2004; Roth 2002, 2004; Sanchez 2007; Webber 2001, 2005).
2. A CASE initiative study for CA Title 24-2013 found that smaller office buildings (10,000 sqft) had an annual electrical savings of 4,900 kwh/year and a demand savings of 1.97 kW. Based on installed costs and utilization of lighting control system elements already installed. The simple payback was 4.2 years. For larger office buildings (175,000 sqft) the annual electrical savings were 107,000 kwh/year and a demand savings of 23.6 kW for a simple payback of 2.4 years.
3. A GSA Green Proving Ground Program study conducted in 8 buildings with monitored receptacle control through market available plug strips found "Results underscored the effectiveness of schedule-based functionality, which reduce plug loads at workstations by 26%, even though advanced computer power management was already in place, and nearly 50% in printer room and kitchens." In the study buildings, receptacle loads averaged 21% of building energy use and monitored more than 295 devices over three different test periods to validate the findings. It found payback through timer scheduled control of kitchens of 0.7 years, printer rooms of 1.1 years and miscellaneous devices in 4.1 years. At workstations, the payback was 7.8 years.
4. A study done on "Office Space Plug Load Profiles and Energy Savings Interventions" at the University of Idaho and presented at the ACEEE summer Study in 2012 found that average savings of 0.60 kWh/SF Yr. with plug strip control interventions. This study provided guidance for utility programs to assist with development of plug load efficiency measures and was based on a more detailed report, "Plug Load Profiles" (Acker, B. et. al. 2012).
5. The DOE Better Buildings program issued a December 2015 "Decision Guides for Plug and Process Loads Controls" to help educate and guide decision processes for effective receptacle-based load control. It highlights that "Plug and Process Loads" account for 33% of the total energy consumed by commercial buildings. It sites seven decision strategies including that of Integrated plug load controls with other building systems as one of the largest for energy savings across most building types for whole-building retrofit and new construction categories.
6. A study performed “Advancing the Last Frontier“ Reduction of Commercial Plug Loads presented at the ACEEE summer study of 2016, indicated field study results demonstrating savings of 19% when deploying plug in control strategies in office workstation environments.

CE235-19: Correction to the Proponent line

CE235-19

Proponent: Jim Edelson, representing New Buildings Institute (jim@newbuildings.org)

CE237-19: Replace Section C406.10 with the following. Remainder of code change is unchanged

CE237-19

Proponent: Harold Jepsen, representing National Electrical Manufacturers Association (harold.jepsen@legrand.us)

C406.10 Energy Monitoring. Buildings shall be equipped to measure, monitor, record and report energy consumption data in compliance with Section C406.10.1 through C406.10.5.

CE240-19: Correction to the Proponent line. Add new Section C406.7 to the code change proposal. Remainder of code change is unchanged

CE240-19

Proponent: Nicholas O'Neil, NW Energy Codes Group, representing NW Energy Codes Group (noneil@energy350.com)

Add new text as follows:

C406.7 Reduced energy use in service water heating. Buildings shall comply with Sections C406.7.1 and either C406 .7.2, C406 .7.3 or C406 .7.4.

CE248-19: Corrected reason statement for Part I & Part II

CE248-19

Proponent: Erika Burns, D+R International, representing Attachments Energy Rating Council (AERC) (aerc316@gmail.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

Reason:
Part I: The IECC is not currently clear on how shades and blinds are to be addressed or not in the performance path. This could lead to potential gaming using different assumptions for shading in the reference and proposed designs, so should be clarified. This has already been addressed in ASHRAE 90.1, but not the IECC.

First, this proposal specifies that manual blinds and shades are to be modeled the same in the reference and proposed designs, or simply omitted. This ensures manual shades are treated neutrally, with no credit for manual shades since occupant behavior and the performance of manual controls cannot be guaranteed. Second, similar to ASHRAE 90.1, it does allow automatically controlled shades to be modeled in the proposed building, as this can provide advanced energy performance without relying on an occupant's behavior. Similar to ASHRAE 90.1, to avoid proprietary issues, the control scheme for how the automated shades are modeled is not specified and is left up to the building team, subject to approval by the code official.

Part II: The IECC is not currently clear on how manual or automated shades and blinds are to be addressed in the performance path, other than specifying an interior shade fraction. This could lead

to potential gaming using different assumptions for shading in the reference and proposed designs, so should be clarified.

First, this proposal specifies that manual blinds and shades are to be modeled the same in the reference and proposed designs. This ensures manual shades are treated neutrally, with no credit for manual shades since occupant behavior and the performance of manual controls cannot be guaranteed. Second, it does allow automatically controlled shades to be modeled in the proposed building, as this can provide advanced energy performance without relying on an occupant's behavior. To avoid proprietary issues, the control scheme for how the automated shades are modeled is not specified and is left up to the designer or builder, subject to approval by the code official. This is similar to how automated shades are already addressed in ASHRAE 90.1 for commercial applications, and a similar proposal has been submitted for the commercial IECC.

CE253-19 Part I: Banner added to explain what committee will hear the code change

CE253-19 Part I

Proponent: William McHugh, The McHugh Company, representing Chicago Roofing Contractors Association (billmchugh-jr@att.net)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

CE255-19 Part I: Banner added to explain what committee will hear the code change

CE255-19 Part I

Proponent: Bill McHugh, The McHugh Company, representing Chicago Roofing Contractors Association (bill@mc-hugh.us)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC- COMMERCIAL COMMITTEE. PART II WILL BE HEARD BY THE IECC-RESIDENTIAL COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

CE263-19: Corrected reason statement for Part I, II, & III

CE263-19

Proponent: Joseph H. Cain, Solar Energy Industries Association (SEIA), representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

THIS IS A 3 PART CODE CHANGE PROPOSAL. PART I WILL BE HEARD BY IECC-CE COMMITTEE. PARTS II and III WILL BE HEARD BY THE IECC-RE COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

Reason:
Part I: This proposal provides a new Appendix chapter for the commercial portion of the IECC, which would be available to jurisdictions wanting to adopt renewable energy requirements for new commercial buildings and additions greater than 5,000 square feet. This proposal continues to move renewable energy into mainstream practice for the design and construction industries, which helps to

decrease demand on utilities. The benefit to the building owner or tenant is lower utility bills. This language does not increase enforcement efforts because the review and inspection process for mechanical and renewable energy systems is currently standard practice.

The Washington State Building Code Council voted to include this language as Appendix D in the Washington State Energy Code. This requirement has been in the main body of the Seattle Energy Code since 2012, and is included as Section C411.

Language has been added to ensure the requirements of the Appendix do not conflict with Section C406. If the on-site renewable energy option in Section C406 is selected, both requirements are cumulative.

Part II: This proposal provides a new Appendix for the residential portion of the IECC which would be available to jurisdictions wanting to adopt renewable energy requirements for new residential buildings; enabling direct opportunity to meet state RPS goals to incorporate renewable energy. This proposal continues to move renewable energy into mainstream practice for the design and construction industries which will diversify the state and jurisdictional energy portfolio amongst traditional energy resources and new renewable generation via utilities and distributed energy resources. The benefit to the homeowner is lower, more consistent energy bills. This language does not increase enforcement efforts because the review and inspection process for mechanical and renewable energy systems is currently standard practice.

This proposal is modeled after the California Energy Commission (CEC) model ordinance language, which is useful to early adopters that want to require PV for new residential buildings in their communities, with modification to allow jurisdictions flexibility to further customize. Individual technical provisions of this appendix are also based on 2019 CA Building Energy Efficiency Standards (BEES):

Joint Appendix JA11 -- Qualification Requirements for Photovoltaic System, and

Section 10-115 -- Community Shared Solar Electric Generation System or Community Shared Battery Storage System Compliance Option for Onsite Solar Electric Generation or Battery Storage Requirements.

Part III: This proposal provides a new Appendix for the International Residential Code which would be available to jurisdictions wanting to adopt renewable energy requirements for new one- and two family dwellings and townhouse buildings; enabling direct opportunity to meet state RPS goals to incorporate renewable energy. This proposal is written to parallel the appendix proposed for the IECC-Residential code provisions found in Part II of this proposal. Please consider the reason statement provided for Part II.

CE264-19: Correction made to the equations in Sections AX104 and AX104.2.3

CE264-19

Proponent: David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

AX104 Minimum renewable energy. On-site renewable energy systems shall be installed or off-site renewable energy shall be procured to offset the building energy.

$RE_{onsite}+RE_{offsite} \geq E_{building}$

where

RE_{onsite} = annual site energy production from on-site renewable energy systems (see Section AX104.2)
$RE_{offsite}$ = adjusted annual site energy production from off-site renewable energy systems that may be credited against building energy use (see Section AX104.3)
$E_{building}$ = building energy use without consideration of renewable energy systems.

When Section C401.2 (2) is used for compliance with the International Energy Conservation Code, building energy shall be determined by multiplying the gross conditioned floor area plus the gross semi-heated floor area of the proposed building by an EUI selected from Table AX104.1. Use a weighted average for mixed-use buildings.

When Section C401.2 (1) or C401.2 (3) is used for compliance with the International Energy Conservation Code, building energy shall be determined from energy simulations.

AX104.2.3 Adjusted Off-Site Renewable Energy. The process for calculating the adjusted *off-site renewable energy*is shown in the following equation:

$$RE_{offsite} = \sum_{i=1}^{n} PF_i \cdot RE_i = PF_1 \cdot RE_1 + PF_2 \cdot RE_2 + \cdots + PF_n \cdot RE_n$$

where

$RE_{offsite}$= Adjusted off-site renewable energy
PF_i=Procurement factor for the i^{th}renewable energy procurement method or class taken from Table AX104.2.
RE_i= Annual energy production for the i^{th}renewable energy procurement method or class
n = The number of renewable energy procurement options or classes considered

2019 GROUP B – PROPOSED CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE

INTERNATIONAL ENERGY CONSERVATION COMMITTEE - RESIDENTIAL

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Code Specialist
NJ Department of Community Affairs,
Division of Codes and Standards
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Jim Meyers, CGP
Director Building Efficiency Programs
Southwest Energy Efficiency Project (SWEEP)
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Dean Potter
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Saugerties, NY

Gil Rossmiller
Plans Examiner
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Denver, CO

Lee Schwartz
Rep: National Association of Home Builders
Executive Vice President for Governmental
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Home Builders Association of Michigan
Lansing, MI

Jim Zengel, CGB, CGP
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Zengel Group
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International Code Council
ICC Field Office-Boise
Boise, Idaho

Kermit Robinson
Senior Technical Staff
International Code Council
Western Regional Office
Brea, CA

Updated 4/17/2019

RE3-19: Remove from after ADM33-19 Part III
RE86-19: Added after RE85-19
RE128: Withdrawn
RE224-19: Part I is before RE224-19 Part II
RE226-19: Remove from after RE85-19 and add after CE217-19 Part II
CE251-19 Part II: Removed from this hearing order
CE255-19 Part II: Added after CE253 Part II
CE259-19 Part II: Removed from this hearing order
CE263-19 Part II: Added after RE223-19
RB212-19 Part II: Added before RE42-19

TENTATIVE ORDER OF DISCUSSION
2019 PROPOSED CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE – RESIDENTIAL
AND
INTERNATIONAL RESIDENTIAL CODE - ENERGY

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RE code change proposals may not be included on this list, as they are being heard by another committee. Note also that RE1 – RE12 are moved to later in the hearing order to allow grouping consideration of proposed changes to Chapters 1 and 3 near the beginning of the consideration of Chapters 1 and 3 of the IECC-Commercial Provisions.

RE15-19
RE16-19
RE17-19
CE42-19 Part II
CE51-19 Part II
CE54-19 Part II
RE18-19
RE19-19
RE20-19
RE21-19
RE22-19
RE23-19
RE24-19
RE25-19
RE26-19
RE27-19
RE28-19
RE29-19
RE30-19
RE31-19
RE32-19
RE33-19
RE34-19
RE35-19
RE36-19
RE37-19
RE38-19
RE39-19
RE40-19
RE41-19
CE60-19 Part II
RB212-19 Part II
RE42-19
RE43-19
RE44-19
RE45-19
RE46-19
RE47-19
RE48-19
RE49-19
CE62-19 Part II
RE50-19
RE51-19
RE52-19
RE53-19
RE54-19
RE55-19
RE56-19
RE57-19
RE58-19
RE59-19
CE78-19 Part II
RE60-19
RE61-19
RE62-19
RE63-19
RE64-19
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RE67-19
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RE87-19
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RE100-19
RE101-19
RE102-19
CE103-19 Part II
RE103-19
RE104-19
CE93-19 Part II
RE105-19
RE106-19
RE8-19
RE107-19
CE151-19 Part II
CE115-19 Part II
CE116-19 Part II
RE108-19
RE109-19
RE110-19
RE111-19
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RE114-19
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RE120-19
RE121-19
RE122-19
RE225-19 Part II
RE123-19
CE150-19 Part II
RE124-19
RE125-19
CE159-19 Part II
RE126-19
RE127-19
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P1-19
RE129-19
RE130-19
RE131-19
RE132-19 Part I
RE132-19 Part II
RE133-19
RE134-19
RE135-19
RE136-19
RE137-19
RE138-19
RE139-19
RE140-19
RE141-19
RE142-19
RE143-19
CE160-19 Part II
RE144-19
RE145-19
RE7-19
RE146-19
RE147-19
CE217-19 Part II
RE226-19
RE148-19
RE149-19
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RE151-19
RE152-19
RE153-19
RE154-19
RE155-19
RE156-19
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RE158-19
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RE160-19
RE161-19
CE248-19 Part II
RE162-19
RE163-19
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RE217-19
~~CE251-19 Part II~~
CE253-19 Part II
CE255-19 Part II
RE218-19
RE219-19
RE220-19
RE221-19
RE222-19
ADM43-19 Part IV
RE223-19
CE263-19 Part II
~~CE259-19 Part II~~
RE224-19 Part I
RE224-19 Part II
CE1-19 Part I
ADM9-19 Part III
ADM10-19 Part IV
ADM46 Part IV
CE3-19 Part II
CE4-19 Part I
CE5-19 Part II
CE6-19 Part II
CE7-19 Part II
CE8-19 Part II
CE9 -19 Part II
CE10-19 Part II
RE1-19
CE11-19 Part II
CE12-19 Part II
CE13-19 Part II
CE15-19 Part II
RE2-19
ADM33-19 Part III
~~RE3-19~~
CE16-19 Part II
ADM31-19 Part III
CE17-19 Part II
ADM41-19 Part IV
ADM40-19 Part IV
CE18-19 Part II
CE20-19 Part II
CE19-19 Part II
RE4-19
CE23-19 Part II
CE22-19 Part II
RE5-19
CE29-19 Part II
CE30-19 Part II
CE31-19 Part II
CE28-19 Part II
RE9-19 Part I
RE6-19
CE32-19 Part II
ADM5-19 Part III
CE34-19 Part II
CE36-19 Part II
CE37-19 Part II
RE12-19
RE11-19
CE40-19 Part II
RE13-19
RE14-19

2019 PROPOSED CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE (RESIDENTIAL)

RE3-19: This has been removed from the hearing order and combined with RE226-19. (See RE226-19 for complete code change)

RE3-19

IECC: R105.2.5

Proponent: Marilyn Williams, representing NEMA (mar_williams@nema.org)

Updated 4/17/2019

RE67-19 Reason statement revised to add weblink for a NAIMA document.

RE67-19

IECC-R: Table R402.4.1.1 (IRC N1102.4.1.1)

Proponent: Robby Schwarz, EnergyLogic, representing EnergyLogic (robby@nrglogic.com)

Reason:
Air barrier and air sealing criteria section:

- This code change proposal is intended to offer clarification to this section of Table R402.4.1.1 for those in the field that use it to build homes that are compliant with the air testing requirements of the IECC. In the 2018 IECC definitions section, air barriers and building thermal envelope where changed to recognize that the air barrier and building thermal envelope are an assembly of things not necessarily one component of the building. See definitions below. By removing poor language regarding continuous air barriers this section has been focused to better define the alignment of the air barrier and thermal barrier. In addition, it offers definition for other requirements in the table for installing an interior air barrier in location like behind a tub.
    - **AIR BARRIER.** One or more materials joined together in a continuous manner to restrict or prevent the passage of air through the *building thermal envelope* and its assemblies.
    - **BUILDING THERMAL ENVELOPE.** The *basement walls, exterior walls*, floors, ceiling, roofs and any other *building* element assemblies that enclose *conditioned space* or provide a boundary between *conditioned space* and exempt or unconditioned space.
- Air sealing measures are called out so the table column should incorporate air sealing in its name as it is different than air ~~barrier~~.
- Insulation Installation ~~Criteria:~~
- Manufacturers of air ~~permeable insulation ha~~ve begun to recognize that their installation literature must incorporate la~~nguage and pictures sh~~owing that air permeable insulation must be enclosed inside of air barrier assemblies. This table promotes this installation instruction in location such as behind tubs, on attic ~~knee wall~~s, etc. Therefore, the general section should begin with an overarching statement that states how air permeable insulation shall be installed.
- See insulation installation instructions from NAIMAÂ (*North American Insulation Manufacturers Association)* at this weblink: http://insulationinstitute.org/wp-content/uploads/2016/03/NAIMA-Tech-Tips-and-Critical-Details-FINAL.pdf

A footnote has been added to ensure a common understanding that insulation installed in a ventilated attic and at the rim joist is not required to be enclosed within an air barrier assembly. The new footnote is necessary as the item it is associated with defines the installed alignment between air barriers and air permeable insulation within building cavity installation, i.e. walls and floor cavities.

Using references to other sections of the code enables reinforcement of what is required. In this case, the reference is to certificates that document the R-values of the material installed which must be created and posted.

Updated 4/17/2019

RE73-19: Image was missing from the reason statement

RE73-19

IECC: TABLE R402.4.1.1

Proponent: Robby Schwarz, EnergyLogic, representing EnergyLogic (robby@nrglogic.com)

Reason: Air barrier and air sealing criteria section:

- There are a number of penetrations that occur through the continuous air barrier assemblies of a home. They are too numerous to list yet some examples are given to create context and additional language was added to ensure that the examples were not thought to be the only penetrations that needs to be sealed.
-

Insulation Installation Criteria:

- Insulating properly around a penetration and the object that is placed through the penetration in the buildings continuous air barrier assembly and thermal envelop is relatively easy to accomplish when insulation is installed after the penetration has been sealed, but when insulation has been installed first and then a penetration is created damaged insulation often occurs. In either instance this new language points out that insulation still must be installed well regardless.

See the following:

Table R402.4.1.1

AIR BARRIER, AIR SEALING AND INSULATION INSTALATION [a,b,c]

COMPONENT	AIR BARRIER AND AIR SEALING CRITERIA	INSULATION INSTALLATION CRITERIA
Shafts, penetrations	Duct shafts, utility penetrations, ~~and~~ flue shaft openings, or other similar penetration to the exterior or unconditioned space shall be air sealed.	Penetrations through the building thermal envelope and what is passed through the penetration, shall not damage or compress the insulation surrounding the penetration.

Reason Statement:

Air barrier and air sealing criteria section:

- There are a number of penetrations that occur through the continuous air barrier assemblies of a home. They are too numerous to list yet some examples are given to create context and additional language was added to ensure that the examples were not thought to be the only penetrations that needs to be sealed.

Insulation Installation Criteria:

- Insulating properly around a penetration and the object that is placed through the penetration in the buildings continuous air barrier assembly and thermal envelop is relatively easy to accomplish when insulation is installed after the penetration has been sealed, but when insulation has been installed first and then a penetration is created damaged insulation often occurs. In either instance this new language points out that insulation still must be installed well regardless.

Cost Statement:

- The proposed language does not increase the cost of construction but rather offers guidance and clarity of existing requirements.

RE81-19: Changes made only to the two rows shown below. Remainder of the code change remains unchanged.

RE81-19

Proponent: Robby Schwarz, EnergyLogic, representing EnergyLogic (robby@nrglogic.com)

2018 International Energy Conservation Code

Revise as follows:

TABLE R402.4.1.1 (IRC N1102.4.1.1)
AIR BARRIER AND INSULATION INSTALLATION[a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Plumbing and wiring	—	In exterior walls, batt insulation shall be cut neatly tofit around wiring and plumbing, or insulation, thaton installation readily conforms to available space,shall extend behind piping and wiring.
Shower/tub and fireplaces on exterior ~~wall~~ walls	~~The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.~~ An air barrier shall be installed to separate the exterior wall insulation from showers, tubs and fireplaces. Tub and shower drain trap penetrations through the subfloor shall be air sealed. Fireplace doors shall comply with the requirements of Section R402.4.2	Exterior walls adjacent to showers, ~~and~~ tubs, and fireplaces shall ~~separate the wall from the shower or tub~~ be insulated and, where insulated with air permeableinsulation, shall be enclosed by an air barrier assembly.

a. Inspection of log walls shall be in accordance with the provisions of ICC 400.

Updated 4/17/2019

RE128-19 Withdrawn

Updated 4/17/2019

RE154-19: Section R405.3 should not have appeared as all new text. Corrected format is shown below.

RE154-19

IECC: R405.3, TABLE R405.3.1 (IRC N1105.3.1) (New)

Proponent: Steven Rosenstock, Edison Electric Institute, representing Edison Electric Institute (srosenstock@eei.org); Keith Dennis, representing NRECA (keith.dennis@nreca.coop)

Revise as follows:

R405.3 (IRC N1105.3) 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 Data System Prices and Expenditures reports. Code officials shall be permitted to require time-of-use pricing in energy cost calculations.

Exception: The energy use based on site energy or source energy expressed in Btu or Btu per square foot of *conditioned floor area* shall be permitted to be substituted for the energy cost. The source energy ~~multiplier for electricity shall be 3.16. The source energy multiplier for fuels other than electricity shall be 1.1.~~estimate multipliers for energy sources shall be taken from Table R405.3.1.

This RE155-19 is now RE226-19.

~~RE155-19~~ RE226-19

IECC: R404.1 (IRC N1104.1)

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association (mar_williams@nema.org)

2018 International Energy Conservation Code

Revise as follows:

R105.2.5 Final inspection. The *building* shall have a final inspection and shall not be occupied until *approved*. The final inspection shall include verification of the installation of all required *building* systems, equipment and controls and their proper operation and the required ~~number of high-efficacy lamps and fixtures.~~ efficacy of luminaires and lamps.

R404.1 (IRC N1104.1) Lighting equipment (Mandatory). Not less than 90 percent of the permanently installed ~~lighting fixtures shall contain only high-efficacy lamps.~~ luminaires shall utilize lamps with an efficacy of at least 65 lumens-per-watt, or have a luminaire efficacy of at least 45 lumens-per-watt.

Reason: Revising this language will:

1. Increase energy efficiency
2. Reduce inconsistency and application confusion in compliance
3. Increase code interpretation and usability
4. Resolve compliance with application, approval and inspection.

This revised language aligns the code with how current LED lighting technology is used

today, provides clearer instructions for inspection and aligns residential lighting efficacy with national standards. The change eliminates confusion caused by the term and definition for "high efficacy lamps". Many residential luminaires now have the lamp integrated into the fixture itself as a single unit instead of two separate components. By putting the efficacy level requirements of both lamps and luminaires in Section R404.1, the improper "high-efficacy lamps" definition is not needed.

Setting lamps at an efficacy of at least 65 lumens-per-watt, aligns the code with the Energy Star lamp specification 2.1. An efficancy level for luminaires) combining lighting housings with lamps or integral light sources) with at least 45 lumens-per-watt requirements, meets the requirements already established in the 2016 code version of California Title 24. The efficacy threshold for fixtures without separate lamps is lower than than for lamps themselves. This is because luminaire efficacy measures only the light coming out of the fixture, not all the light emitted directly from the light source inside. There are many optical inefficiencies in a fixture. Some of tyhe light that comes directly from the light source is lost inside the fixture, therefore, lowering the efficacy.

Cost Impact: Today's cost to use the more efficient LED lamps and luminaires is now equal to or lower than the cost of CFL lamps.

Updated 4/17/2019

RE180-19: Reason is reproduced to include the two images.

RE180-19

IECC: R405.3

Proponent: Chris McTaggart, Building Efficiency Resources, representing Building Efficiency Resources (cmctaggart@theber.com)

Reason: The current R405 option to demonstrate compliance using comparative annual energy cost between the *proposed design* and *standard reference design* introduces an inappropriate additional variable of utility costs that can radically confuse compliance.

The ratios between fuel and electricity costs are constantly changing, which can result in a *proposed design* based on a builder's typical set of architectural plans that achieves compliance on the day that the costs were aggregated, but which does not comply days or months after when costs change. Therefore you can have two homes built from the say planset, with the same specs, built to the same code by the same builder in the same geographic area with one being compliant and the other non-compliant, simply becuase of variations in the ratios of electric vs fuel costs over time. Similarly, you could have two homes built from the say planset, with the same specs, built to the same code by the same builder at the exact same time in the same geographic areat - but in different energy utility territories - with one being compliant and the other non-compliant, simply because they use different utility providers with differing costs.

Furthermore, it is an excessive burden for a code official to have to create and implement their own process for validating the energy utility cost data used in the software file. For one, there is little guidance in the code for code officials for how to define what cost data or process of creating/maintaining cost data is acceptable. The current code suggests that EIA state-average data could be used, which is ok, but should this data be updated monthy? Annually? The EIA state-average data fluctuates month-by-month, and is often seasonal in nature; some software programs allow seasonal inputs, but again - is that what's expected or is it simply an annual average? How often should this cost data be updated? What if a barely-passing planset in a residential development no longer passess with updated energy cost data after the first year of a multi-year build out? If not using EIA data, finding actual data from the specific utilities in question is a huge undertaking, as the fee, rate and tarrif sheets from utilites are typically massive and complex. There are simply too many questions, variables and outliers associated with cost-based compliance due to the variablility and ever changing nature of energy costs. This introduces confusion and a "wildcard" that the code official may not truly understand or understand how to reasonably assess

what's fair and reasonable. The "x-factor" of energy costs and the relative difference between fuels and electricity introduce an independent variable that really has to use when assessing building energy efficiency from a compliance standpoint. It is not reasonable to have a variable such as cost be able to change the same planset's compliance within the same code cycle depending on what and when cost data is pulled, and potentially utility vs utility.

This proposal seeks to simplify the Performance compliance process by focusing on known, fixed energy use calculations, resulting in a compliance path that is based exclusively on building energy characteristics and climate data. The proposal maintains the previous "exceptions" of using source energy use or use per sqft of *conditioned floor area* (otherwise known as a source EUI). While there no doubt has been fair debate over time regarding site vs source energy, electricity vs fuel source energy factors, total energy vs EUI, etc, this proposal does not seek to resolve those conflicts but instead elects to adopt the prevoius "exception" compliance options already adopted into previous energy codes.

To document the need for this change, I have uploaded two PDF compliance documents produced from REM/Rate software for a planset seeking to comply with the current 2012 IECC with state amendments in Iowa. The *proposed design* complies with the code by achieving exact cost compliance in dollars as the *standard reference design* when using 2015 EIA state average cost data, which were the current costs at the time this planset was originally run in the software for compliance. When updating the model to only change costs to the most up-to-date EIA state data (2017), the home now does not comply with the code as the *proposed design* is estimated to cost more to operate than the *standard reference design*.

Currently, all software programs that are popularly used to demonstrate compliance (REM/Rate, REM/Design, Ekotrope, EnergyGauge) are set up to create R405 compliance reports exclusively compute cost compliance; they are not set up to express compliance using annual source energy. However, all of these software programs have the ability to configure the Performance compliance reports for either annual source energy or EUI.

2012 Iowa Energy Cost Compliance

Property	Organization	HERS
, IA		Projected Rating
	Builder	Rater ID:

Weather:Des Moines, IA
IA 2015 costs.blg

Home complies using 2015 EIA costs

Annual Energy Cost

$/yr

	2012 Iowa Energy Code	As Designed
Heating	439	448
Cooling	181	172
Water Heating	153	153
SubTotal - Used to Determine Compliance	**772**	**772**
Mechanical Ventilation Fan	31	48
Lights & Appliances (minus MechVent)	982	941
Photovoltaics	-0	-0
Service Charge	120	120
Total	**1905**	**1881**

Mandatory Requirements

Annual Energy Cost Check	PASSES
Duct Insulation R-Value Check (per Section 405.2)	PASSES
Window U-Value and SHGC Check (per Section 402.5)	PASSES
Home Infiltration (Section 402.4.1.2)	PASSES
Duct Leakage (Section 403.2.2)	PASSES
Mechanical Ventilation (Section 403.5)	PASSES
Mechanical Ventilation Fan Efficacy (Section 403.5.1)	PASSES
Mandatory Requirements Check Box (2012 IECC)	PASSES

This home MEETS the annual energy cost requirements of Section 405 of the 2012 Iowa Energy Conservation Code based on a climate zone of 5A.

Name		Signature	
Organization		Date	14 January 2019

In accordance with IECC, building inputs, such as setpoints, infiltration rates, and window shading may have been changed prior to calculating annual energy cost. Furthermore, the standard reference design HVAC system efficiencies are set equal to those in the design home as specified in the 2012 IECC. These standards are subject to change, and software updates should be obtained periodically to ensure the compliance calculations reflect current federal minimum standards.

2012 Iowa Energy Cost Compliance

Property	Organization	HERS
, IA		Projected Rating
	Builder	Rater ID:

Weather: Des Moines, IA
IA 2015 costs.blg

Home does not comply with 2017 EIA costs

Annual Energy Cost

$/yr

	2012 Iowa Energy Code	As Designed
Heating	469	481
Cooling	164	156
Water Heating	165	165
SubTotal - Used to Determine Compliance	**799**	**802**
Mechanical Ventilation Fan	28	43
Lights & Appliances (minus MechVent)	893	856
Photovoltaics	-0	-0
Service Charge	120	120
Total	**1839**	**1821**

Mandatory Requirements

The following Mandatory Requirements Fail:

Annual Energy Cost Check

Design must be equal or lower	799	802

This home DOES NOT meet the annual energy cost requirements of Section 405 of the 2012 Iowa Energy Conservation Code based on a climate zone of 5A.

Name		Signature	
Organization		Date	14 January 2019

In accordance with IECC, building inputs, such as setpoints, infiltration rates, and window shading may have been changed prior to calculating annual energy cost. Furthermore, the standard reference design HVAC system efficiencies are set equal to those in the design home as specified in the 2012 IECC. These standards are subject to change, and software updates should be obtained periodically to ensure the compliance calculations reflect current federal minimum standards.

RE186-19: The equation did not appear struck out in the Committee Action Hearing agenda

RE186-19

Proponent: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing self (joe@buildingscience.com)

Revise as follows:

R406.3 (IRC N1106.3) Energy Rating Index. The Energy Rating Index (ERI) shall be determined in accordance with RESNET/ICC 301 ~~except for buildings covered by the International Residential Code, the ERI Reference Design Ventilation rate shall be in accordance with Equation 4-1~~.

~~Ventilation rate, CFM = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)]~~

~~**(Equation 4-1)**~~

Exceptions:

1. For Table 4.2.2(1) of RESNET/ICC 301, the Reference Home and Rated Home air exchange rates shall be as specified for the air exchange rates in Table R405.5.2(1) of this code.
2. For Table 4.3.1(1) of RESNET/ICC 301, the air exchange rate shall be as specified for the air exchange rate for the standard reference design in Table R405.5.2(1) of this code.
3. The proposed ventilation rate shall comply with the mechanical ventilation requirements of Section M1505 of the International Residential Code or Section 403.3.3.2.1 of the International Mechanical Code.

Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the *ERI reference design* or the *rated design*.

Updated 4/17/2019

RE206-19: Renumber Item 2.3 to be Item 3. There are no other changes to the proposal

RE206-19

R401.2, R401.2.1 (IRC N1101.13.1) (New), R407 (IRC N1107) (New), R407.1 (IRC N1107.1) (New), R407.2 (IRC N1107.2) (New), TABLE R407.2 (IRC N1107.2) (New)

Proponent: William Fay, Energy-Efficient Codes Coalition, representing Energy-Efficient Codes Coalition (bfay@ase.org); Maureen Guttman, BCAP-IBTS, representing BCAP-IBTS (mguttman@bcapcodes.org)

2018 International Energy Conservation Code

Add new text as follows:

R401.2.1 (IRC N1101.13.1) Additional energy efficiency (Mandatory). This section establishes additional requirements applicable to all compliance approaches to achieve additional energy efficiency.

1. For buildings complying under Sections R401 through R404, one or more additional energy efficiency measures shall be installed in accordance with Section R407.2 that cumulatively equal or exceed 5 Flex Points.
2. For buildings complying under the simulated performance alternative in Section R405, the building shall meet one of the following:
   2.1. One or more additional energy efficiency measures in Section R407.2 shall be installed that cumulatively equal or exceed five Flex Points, without including such measures in the proposed design under Section R405; or
   2.2. The proposed design of the building under Section R405.3 shall have an annual energy cost that is less than or equal to 95 percent of the annual energy cost of the standard reference design.
3. For buildings that comply under the energy rating index alternative in Section R406, the energy rating index value shall be at least 5 percent less than the energy rating index target specified in Table R406.4.

Updated 4/17/2019

RE218-19: Correction to the Exception

RE218-19

IECC: R503.1.4

Proponent: Marilyn Williams, representing National Electrical Manufacturers Association (mar_williams@nema.org)

Revise as follows:

R503.1.4 (IRC N1109.1.4) Lighting. New lighting systems that are part of the *alteration* shall comply with Section R404.1.R404.1.

Exception: *Alterations* that replace less than ~~50~~ 10 percent of the luminaires in a space, provided that such *alterations* do not increase the installed interior lighting power.

2019 GROUP B – PROPOSED CHANGES TO THE INTERNATIONAL GREEN CONSTRUCTION CODE

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~~Lexington, MA~~

Staff Secretariat:
Allan Bilka, RA
Senior Staff Architect
International Code Council
Central Regional Office
Country Club Hill, IL 8

RB8-19: Moved to after RB84-19
S34-19 Part II: Remove from after RB282-19

TENTATIVE ORDER OF DISCUSSION 2019 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE –BUILDING

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RB code change proposals may not be included on this list, as they are being heard by another committee.

ADM9-19 Part IV
ADM10-19 Part II
CE17-19 Part II
ADM16-19 Part II
RB1-19
RB2-19
ADM24-19 Part II
ADM46-19 Part II
ADM32-19 Part II
ADM37-19 Part II
ADM38-19 Part II
ADM39-19 Part II
ADM40-19 Part II
ADM41-19 Part II
RB3-19
RB4-19
RB5-19
RB6-19
RB7-19
~~RB8-19~~
RB9-19
RB10-19
RB11-19
RB12-19
RB13-19
RB14-19
G4-19 Part II
RB15-19
RB16-19
RB17-19
RB18-19
RB19-19
RB20-19
RB21-19
RE9-19 Part II
RB22-19
ADM5-19 Part II

RB23-19
RB24-19
RB25-19
G12-19 Part II
RB26-19
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RB30-19
RB31-19
RB32-19
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EB101-19 Part II
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RB283-19
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RB300-19
RB301-19
RB302-19

2019 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE (BUILDING)

RB16-19: The highlighted text did not appear in the code change

RB16-19

Proponent: John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

Revise as follows:

~~[RB]~~ INSULATING SHEATHING. ~~An insulating board~~ A rigid panel or board insulation material having a thermal resistance of not less than R-2 of the core material with properties suitable for use on walls, floors, roofs, or foundations. ~~For the definition applicable in Chapter 11, see Section N1101.6.~~

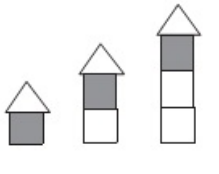
RB36-19: Table R602.10.3(1)- see highlighted change.
Table R602.10.6.4 - Table was cut off in the code change.

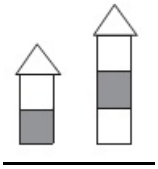
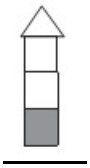
RB36-19

Proponent: Jennifer Goupil, American Society of Civil Engineers (ASCE), representing American Society of Civil Engineers (ASCE) (jgoupil@asce.org); T. Eric Stafford, Insurance Institute for Business and Home Safety, representing Insurance Institute for Business and Home Safety(testafford@charter.net); Don Scott, PCS Structural Solutions, representing Representing National Council of Structural Engieers Association (dscott@pcs-structural.com)

Portions of table not shown remain unchanged.

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

• EXPOSURE CATEGORY B • 30-FOOT MEAN ROOF HEIGHT • 10-FOOT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Ultimate Design Wind Speed(mph)	Story Location	Braced Wall Line Spacing[c](feet)	Method LIB[b]	Method GB	Methods DWB, WSP, SFB,PBS, PCP, HPS,BV-WSP, ABW, PFH,PFC, CS-SFB	Methods CS-WSP, CS-G,CS-PF
< 95 mph		10	2.5	2.5	1.5	1.5
		20	4.5	4.5	2.5	2.5
		30	6.5	6.5	4.0	3.5
		40	8.5	8.5	5.0	4.0
		50	10.5	10.5	6.0	5.0
		60	12.5	12.5	7.0	6.0

• EXPOSURE CATEGORY B • 30-FOOT MEAN ROOF HEIGHT • 10-FOOT WALL HEIGHT • 2 BRACED WALL LINES			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a]			
Ultimate Design Wind Speed(mph)	Story Location	Braced Wall Line Spacing[c](feet)	Method LIB[b]	Method GB	Methods DWB, WSP, SFB,PBS, PCP, HPS,BV-WSP, ABW, PFH,PFC, CS-SFB	Methods CS-WSP, CS-G,CS-PF
		10	5.0	5.0	3.0	2.5
		20	8.5	8.5	5.0	4.5
		30	12.5	12.5	7.0	6.0
		40	16.0	16.0	9.5	8.0
		50	20.0	20.0	11.5	10.0
		60	23.5	23.5	13.5	11.5
		10	NP	7.0	4.0	3.5
		20	NP	13.0	7.5	6.5
		30	NP	18.5	10.5	9.0
		40	NP	24.0	13.5	11.5
		50	NP	29.5	17.0	14.5
		60	NP	35.0	20.0	17.0

Portions of table not shown remain unchanged.

TABLE R602.10.6.4
TENSION STRAP CAPACITY FOR RESISTING WIND PRESSURES PERPENDICULAR TO METHODS PFH, PFG AND CS-PF BRACED WALL PANELS[a]

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (feet)	MAXIMUM TOTAL WAL LHEIGHT (feet)	MAXIMUM OPENING WIDTH (feet)	TENSION STRAP CAPACITY REQUIRED (pounds)[a]					
				Ultimate Design Wind Speed V_{ult} (mph)					
				≤110	115	130	≤110	115	130
				Exposure B			Exposure C		

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
DR = Design Required.
a. Straps shall be installed in accordance with manufacturer's recommendations.

RB81-19: New Section 307.1 should read 307.3. See highlighted text
Replace the image "Tables 2(a) Bathtubs & Showers plus 2(b) Toilets" in the reason statement with the following:

RB81-19

Proponent: Jake Pauls, representing self (bldguse@aol.com)

R307.3 Grab bars. Grab bars shall be in accordance with Sections R303.3.1 trough R303.3.7.

Bathtubs & showers			Hospital-admitted		
Age	Doc/Outp	ED	via ED	Direct	Total
00-09	92.0	107.1	3.3	1.6	204.0
10-19	84.6	54.7	1.3	0.5	141.1
20-29	159.5	81.7	3.1	1.1	245.4
30-39	273.7	90.4	3.7	1.1	368.9
40-49	301.5	88.6	5.5	1.7	397.2
50-59	283.8	87.6	8.8	3.1	383.2
60-69	222.1	77.4	15.6	5.2	320.3
70-79	284.3	105.9	33.3	10.4	433.8
>=80	429.0	201.0	90.4	24.7	745.1
Total	215.2	89.6	10.3	3.2	318.3

Toilets			Hospital-admitted		
Age	Doc/Outp	ED	via ED	Direct	Total
00-09	20.2	19.2	0.6	0.2	40.1
10-19	7.1	6.0	0.3	0.1	13.4
20-29	17.5	12.2	0.6	0.3	30.6
30-39	37.7	14.7	1.2	0.3	53.9
40-49	46.0	16.3	2.6	1.0	65.8
50-59	61.7	21.6	5.1	1.6	90.0
60-69	93.3	32.6	12.8	4.4	143.1
70-79	154.7	59.2	32.8	10.4	257.0
>=80	375.0	179.8	112.0	30.1	696.9
Total	57.6	25.3	8.7	2.6	94.3

RB106-19: Corrected the format of Table R311.5.4

RB106-19

Proponent: John Davis, Miami County, Kansas, representing Self (mdavis@miamicountyks.org)

TABLE R311.5.4
ALLOWABLE STAIR STRINGER SPAN

Stringer Depth	Stairway Width									
	36 Inches				42 Inches		44 Inches		46 Inches	
	2 Stringers		3 Stringers		3 Stringers		3 Stringers		3 Stringers	
	Maximum Run (feet-inches)	Maximum Rise (feet-inches)	Maximum Run (feet-inches)	Maximum Rise (feet-inches)	Maximum Run (feet-inches)	Maximum Rise (feet-inches)	Maximum Run (feet-inches)	Maximum Rise (feet-inches)	Maximum Run (feet-inches)	Maximum Rise (feet-inches)
2X10	3-9	4-0	4-3	4-6	4-1	4-4	4-0	4-3	3-11	4-2
2X12	6-5	6-4	7-3	7-1	6-11	6-10	6-10	6-9	6-8	6-7

RB132-19: Replace Section R316.3 with the following

RB132-19

Proponent: John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

R316.3 Surface burning characteristics. Unless otherwise allowed in Section R316.5, foam plastic, or foam plastic cores used as a component in manufactured assemblies, used in building construction shall comply with R316.3.1 or R316.3.2. ~~have a flame spread index of not more than 75 and shall have a smoke-developed index of not more than 450 when tested in the maximum thickness and density intended for use in accordance with ASTM E84 or UL 723.~~ Loose-fill-type foam plastic insulation shall be tested as board stock for the flame spread index and smoke-developed index.

> ~~**Exception:** Foam plastic insulation more than 4 inches (102 mm) thick shall have a flame spread index of not more than 75 and a smoke-developed index of not more than 450 where tested at a thickness of not more than 4 inches (102 mm), provided that the end use is *approved* in accordance with Section R316.6 using the thickness and density intended for use.~~

Updated April 2, 2019

RB136-19: Exception to Section R317.1 should be underlined

RB136-19

Proponent: Paul Coats, representing American Wood Council (pcoats@awc.org)

R317.1 Location required. Protection of wood and wood-based products from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative-treated in accordance with AWPA U1.

1. Wood joists or the bottom of a wood structural floor where closer than 18 inches (457 mm) or wood girders where closer than 12 inches (305 mm) to the exposed ground in crawl spaces or unexcavated area located within the periphery of the building foundation.
2. Wood framing members that rest on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.
3. Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.
4. The ends of wood girders entering exterior masonry or concrete walls having clearances of less than $^1/_2$ inch (12.7 mm) on tops, sides and ends.
5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.
6. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.
7. Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below *grade* except where an *approved* vapor retarder is applied between the wall and the furring strips or framing members.
8. Portions of wood structural members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or water accumulation on the surface or at joints between members.

   Exception: Sawn lumber used in buildings located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or perservative-treated wood where the structure is exposed to the weather.

RB161-19: New ASTM standard did not appear in the code change

RB161-19

Proponent: Eirene Knott, BRR Architecture, representing Metropolitan Kansas City Chapter of the ICC (Eirene.Knott@brrarch.com); David Allen, representing Edward Wayne Inc. (davidallen89@att.net); Ron Olberding, representing Edward Wayne Inc. (ronolberding@sbcglobal.net)

ASTM
F476 - 14: Standard Test Methods for Security of Swinging Door Assemblies

Updated 4/17/2019

RB204-19: See highlighted text to Table R602.10.3(3). See added images and highlighted text to Table R602.10.6.5.

RB204-19

IRC: TABLE R602.10.3(3), TABLE R602.10.3(4), TABLE R602.10.6.5

Proponent: Kelly Cobeen, Wiss Janney Elstner Associates, representing Federal Emergency Management Agency and Applied Technology Council Seismic Code Support Committee (FEMA/ATC SCSC) (KCobeen@wje.com); Julie Furr, Rimkus Consulting Group, representing Federal Emergency Management Agency and Applied Technology Council Seismic Code Support Committee (FEMA/ATC SCSC) (jfurr@rimkus.com); Michael Mahoney, representing Federal Emergency Management Agency (mike.mahoney@fema.dhs.gov)

TABLE R602.10.3(3)
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY

SOIL CLASS D[b] WALL HEIGHT = 10 FEET 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a, f]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length(feet)[c]**	**Method LIB[d]**	**Method GB**	**Methods DWB, SFB, PBS,PCP, HPS,CS-SFB[e]**	**Method WSP**	**Methods CS-WSP,CS-G, CS-PF**
D_2[g]		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0

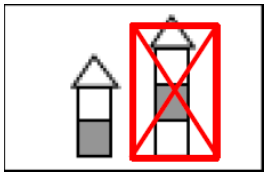
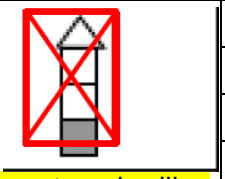
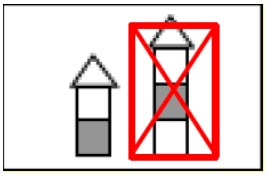
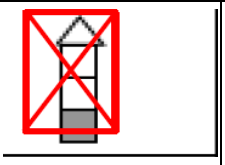
SOIL CLASS D[b] WALL HEIGHT = 10 FEET 10 PSF FLOOR DEAD LOAD 15 PSF ROOF/CEILING DEAD LOAD BRACED WALL LINE SPACING 25 FEET			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE[a, f]				
Seismic Design Category	**Story Location**	**Braced Wall Line Length(feet)[c]**	**Method LIB[d]**	**Method GB**	**Methods DWB, SFB, PBS,PCP, HPS,CS-SFB[e]**	**Method WSP**	**Methods CS-WSP,CS-G, CS-PF**
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
	 Three-story dwelling	10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

TABLE R602.10.6.5
METHOD BV-WSP WALL BRACING REQUIREMENTS

SEISMIC DESIGNCATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)					SINGLE-STORYHOLD-DOWNFORCE(pounds)[ab]	CUMULATIVE HOLD-DOWNFORCE (pounds)[bc]
		10	20	30	40	50		
		Minimum Total Length (feet) of Braced Wall Panels Required Along each Braced Wall Line						
D_2[a]		5.5	11.0	16.5	22.0	27.5	2300	

SEISMIC DESIGNCATEGORY	STORY	BRACED WALL LINE LENGTH (FEET)					SINGLE-STORYHOLD-DOWNFORCE(pounds)[ab]	CUMULATIVE HOLD-DOWNFORCE (pounds)[bc]
		10	20	30	40	50		
		Minimum Total Length (feet) of Braced Wall Panels Required Along each Braced Wall Line						
		5.5	11.0	16.5	22.0	27.5	3900	6200
	 Three-story dwelling	NP	NP	NP	NP	NP	NA	NA

(Portions of table not shown remain unchanged)

RB212-19 Part II: Table R402.1.2 - Table was cut off in the code change. Reason and cost impact did not appear in the Committee Action Hearing Agenda.

RB212-19 Part II

Proponent: Vladimir Kochkin, Home Innovation Research Labs, representing Home Innovation Research Labs (vkochkin@homeinnovation.com); Patricia Gunderson, Home Innovation Research Labs, representing Home Innovation Research Labs (pgunderson@homeinnovation.com)

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASSWALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE& DEPTH	CRAWLSPACE[c] WALL *R*-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.32	0.55	0.25	38	20 or 13+5[h]	8/13	19	5/13[f]	0	5/13
4 except Marine	0.32	0.55	0.40	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.30	0.55	NR	49	20 or 13+5[h,i]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.30	0.55	NR	49	20+5[h,i] or	15/20	30[g]	15/19	10, 4 ft	15/19

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASSWALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE& DEPTH	CRAWLSPACE[c] WALL *R*-VALUE
					13+10[h,i]					
7 and 8	0.30	0.55	NR	49	20+5[h,i] or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

NR = Not Required. For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. U-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not less than the *R*-value specified in the table.

b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

   Exception: In Climate Zones 1 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.

c. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

d. R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation *R*-value for slabs. as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

g. Alternatively, insulation sufficient to fill the framing cavity and providing not less than an *R*-value of R-19.

h. The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, "13+5" means R-13 cavity insulation plus R-5 continuous insulation.

i. Mass walls shall be in accordance with Section R402.2.5. The second *R*-value applies where more than half of the insulation is on the interior of the mass wall.

j. <u>EPW wood-frame wall system utilizing foam plastic and cavity insulation equal to or exceeding the prescribed R-values shall satisfy the prescriptive minimum insulation requirements for CZ 3-8.</u>

Reason: The Extended Plate Wall (EPW) provides a compliance option for meeting energy code requirements for above-grade walls. In addition, it provides a construction option for many above-code energy efficiency and green programs. EPW represents a method of construction that uses standard framing, sheathing, fastening, and insulating materials configured for optimized constructability and performance. EPW preserves many traditional construction practices while achieving better levels of energy performance. The system has been extensively evaluated over the course of 5 years for its structural performance, moisture performance, energy performance, and constructability in the field. The evaluations have been funded by the USDA's Forest Products Laboratory, U.S. Department of Energy, New York State Energy Research and Development Authority, and American Chemistry Council. Four demonstration homes have been constructed and are now occupied. The wall system can be assembled in the field or fabricated in a factory for on-site installation. Results of evaluations and structural testing, background information, and design and

construction guidance are available at www.homeinnovation.com/EPW. Based on the scope of the evaluations, the proposed system is limited to low-seismic and low-wind areas.

Bibliography: www.homeinnovation.com/EPW

Cost Impact: This proposal adds a new optional solution for achieving compliance with current energy code provisions.

RB216-19: Table R702.3.5 - Table was cut off in the code change.

RB216-19

Proponent: Rick Allen, International Staple, Nail and Tool Association, representing International Staple, Nail and Tool Association (rallen@isanta.org)

Portions of table not shown remain unchanged.

TABLE R702.3.5
MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD AND GYPSUM PANEL PRODUCTS

THICKNESS OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS (inches)	APPLICATION	ORIENTATION OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS TOFRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)	MAXIMUM SPACING OFFASTENERS (inches)		SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING[c]
				Nails[a]	Screws[b]	
Application without adhesive						
3/8	Ceiling[d]	Perpendicular	16	7	12	13 gage, 1 1/4″ long, 19/64″ head; 0.098″ diameter, 1 1/4″ long, ~~annular-ringed~~ ring shank; or 4d cooler nail, 0.080″ diameter, 1 3/8″ long, 7/32″ head.
	Wall	Either direction	16	8	16	
1/2	Ceiling	Either direction	16	7	12	13 gage, 1 3/8″ long, 19/64″ head; 0.098″ diameter, 1 1/4″ long, ~~annular-ringed~~ ring shank; 5d cooler nail, 0.086″ diameter, 1 5/8″ long, 15/64″ head; or gypsum board nail, 0.086″ diameter, 1 5/8″ long, 9/32″ head.
	Ceiling[d]	Perpendicular	24	7	12	
	Wall	Either direction	24	8	12	
	Wall	Either direction	16	8	16	
5/8	Ceiling	Either direction	16	7	12	13 gage, 1 5/8″ long, 19/64″ head; 0.098″ diameter, 13/8″ long, ~~annular-~~
	Ceiling	Perpendicular	24	7	12	

THICKNESS OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS (inches)	APPLICATION	ORIENTATION OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS TOFRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)	MAXIMUM SPACING OFFASTENERS (inches)		SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING[c]
				Nails[a]	Screws[b]	
						~~ringed~~ ring shank; 6d cooler nail, 0.092″ diameter, $1^{7}/_{8}$″ long, $^{1}/_{4}$″ head; or gypsum board nail, 0.0915″ diameter, $1^{7}/_{8}$″ long, $^{19}/_{64}$″ head.
	Type X atgarage ceiling beneath habitable rooms	Perpendicular	24	6	6	$1^{7}/_{8}$″ long ~~6d coated~~ 0.099" diameter galvanized nails or equivalent drywall screws. Screws shall comply with Section R702.3.5.1
	Wall	Either direction	24	8	12	13 gage, $1^{5}/_{8}$″ long, $^{19}/_{64}$″ head; 0.098″ diameter, $1^{3}/_{8}$″ long, ~~annular-ringed~~ ring shank; 6d cooler nail, 0.092″ diameter, $1^{7}/_{8}$″ long, $^{1}/_{4}$″ head; or gypsum board nail, 0.0915″ diameter, $1^{7}/_{8}$″ long, $^{19}/_{64}$″ head.
	Wall	Either direction	16	8	16	

For SI: 1 inch = 25.4 mm.

a. For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than $2^{1}/_{2}$ inches apart shall be permitted to be used with the pair of nails spaced 12 inches on center.

b. Screws shall be in accordance with Section R702.3.5.1. Screws for attaching gypsum board or gypsum panel products to structural insulated panels shall penetrate the wood structural panel facing not less than $^{7}/_{16}$ inch.

c. Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than $^{5}/_{8}$ inch longer than the gypsum board or gypsum panel product thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 5d, $13^{1}/_{2}$ gage, $1^{5}/_{8}$ inches long, $^{15}/_{64}$-inch head for $^{1}/_{2}$-inch gypsum board or gypsum panel product; and 6d, 13 gage, $1^{7}/_{8}$ inches long, $^{15}/_{64}$-inch head for $^{5}/_{8}$-inch gypsum board or gypsum panel product.

d. Three-eighths-inch-thick single-ply gypsum board or gypsum panel product shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, either hand or spray applied, the gypsum board or gypsum panel product shall be applied perpendicular to framing. Where applying a water-based texture material, the minimum gypsum board thickness shall be increased from $^{3}/_{8}$ inch to $^{1}/_{2}$ inch for 16-inch on center framing,

and from 1/2 inch to 5/8 inch for 24-inch on center framing or 1/2-inch sag-resistant gypsum ceiling board shall be used.

Updated 4/17/2019

RB220-19: Replace Section R702.7. No changes to remainder of the code change. The table in the reason statement was cut off in the code change.

RB220-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council; Vladimir Kochkin, Home Innovation Research Labs, representing Home Innovation Research Labs (vkochkin@homeinnovation.com)

R702.7 Vapor retarders. Class I or II vapor retarders are required on the interior side of frame walls in Climate Zones 5, 6, 7, 8 and Marine 4. Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7 and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method, Procedure B. Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.
4. Conditions where Class III vapor retarders are permitted in Section R702.7.1.

Reason: This proposal coordinates with an identical proposal (FS127-18) approved for the 2021 IBC. It corrects an inadvertent extension of Climate Zone 7 requirements into Climate Zone 8 when the table was first introduced to the IBC and IRC. It provides consistent requirements and performance for Climate Zone 8 distinct from Climate Zone 7 that accounts for the colder climate in Climate Zone 8.

Various associations developed proposals to modify the 2021 Group A vapor retarder section which were subsequently approved by the ICC membership. These proposals act as a package of changes that improve the format and content of this code section. The collaborative group believes this package of code changes will result in regulations that adequately address the moisture management in residential buildings. We have submitted a similar grouping of proposals to make a corresponding change to the IRC. The table below correlates the code proposals between the Group A and B hearings.

CORRELATION BETWEEN GROUP A AND B PROPOSALS				
Group A Hearing				Group B
Proposal	IBC Code Section	Proponent	Description	IRC Section
FS-117	1404.3, 1404.3(1) (New), 1404.3(2) (New), TABLE 1404.3.2, 1404.3.2, 1404.3.3, 1404.3.4	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Reorganizes and streamlines section to make requirements more transparent	IRC Section R702.7
FS-118	1404.3, 1404.3.1	Theresa Weston, DuPont, representing Air Barrier Association	Adds exception describing requirements for Class I and II smart vapor retarders (greater than 1 perm per ASTM E96 Procedure B) to be allowed in all climate zones	IRC Section R702.7
FS-119	1404.3, 1404.3.1, 1404.3.2, 1404.3.3, TABLE 1404.3.3	Kingston Chow, APA - The Engineered Wood Association, representing APA - The Engineered Wood Association; Borjen Yeh (same)	Reorganization (moves vapor retarder classes to first section). Redundant to the changes made in FS-117.	See FS-117
FS-120	1404.3.1, TABLE 1404.3.1 (New), 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council; Vladimir Kochkin, representing Home Innovation Research Labs	Provides continuous insulation requirements for use with Class II VR and deletes restriction to Class III only. Requires approved design for double vapor barrer (Class I on interior and exterior).	IRC Section R702.7
FS-121	1404.3.1, 1404.3.2	Mike Fischer, Kellen Company, representing The Polyisocyanurate Insulation Manufacturers Association	Focuses on deleting the Class III only limit and restores code to pre-2015.	IRC Section R702.7
FS-122	1404.3.2, 1404.3.2.1 (New), 1404.3.2.2 (New), 1404.3.2.2.1 (New), TABLE 1404.3.2	Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council	The proposal adds charging language that clarifies how the combination of different insulating methods can provide appropriate moisture control so that the total required R-Value can be achieved by continuous, cavity, or a combination of insulation strategies.	IRC Section R702.7
FS-125	TABLE 1404.3.2, 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Expands Marine 4 to all of CZ 4 and allows use of Class III in CZ 1-3.	IRC Section R702.7
FS-127	TABLE 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Separate CZ 8 from Climate Zone 7 to ensure consistent performance in CZ 8	IRC Section R702.7
FS-128	TABLE 1404.3.2	Craig Conner, representing self ; Joseph Lstiburek, representing Self	Same as FS127	IRC Section R702.7
FS-130	TABLE 1404.3.2	Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council	Adds footnote that prevents addition of spray foam and ci R-values for energy code	IRC Section R702.7
FS-131	1404.3.3	John Woestman, Kellen Co., representing Extruded Polystyrene Foam Association (XPSA)	Improves requirements for vapor retarder paints to ensure performance by compliance with manufacturer instructions	IRC Section R702.7

Updated 4/17/2019

RB222-19/ RB223-19/ RB224-19/ RB225-19: The table in the reason statement was cut off in the code change.

RB222-19/RB223-19/RB224-19/RB225-19

RB222-19; RB224-19; RB225-19/ Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

RB223-19/ Proponent: Rob Brooks, representing DowDuPont (rob.brooks.mail@gmail.com); Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Mike Fischer, representing The Center for the

Polyurethanes Industry of the American Chemistry Council (mfischer@kellencompany.com); John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

Reason: This proposal coordinates with an identical proposal (FS127-18) approved for the 2021 IBC. It corrects an inadvertent extension of Climate Zone 7 requirements into Climate Zone 8 when the table was first introduced to the IBC and IRC. It provides consistent requirements and performance for Climate Zone 8 distinct from Climate Zone 7 that accounts for the colder climate in Climate Zone 8.

Various associations developed proposals to modify the 2021 Group A vapor retarder section which were subsequently approved by the ICC membership. These proposals act as a package of changes that improve the format and content of this code section. The collaborative group believes this package of code changes will result in regulations that adequately address the moisture management in residential buildings. We have submitted a similar grouping of proposals to make a corresponding change to the IRC. The table below correlates the code proposals between the Group A and B hearings.

CORRELATION BETWEEN GROUP A AND B PROPOSALS				
Group A Hearing				Group B
Proposal	IBC Code Section	Proponent	Description	IRC Section
FS-117	1404.3, 1404.3(1) (New), 1404.3(2) (New), TABLE 1404.3.2, 1404.3.2, 1404.3.3, 1404.3.4	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Reorganizes and streamlines section to make requirements more transparent	IRC Section R702.7
FS-118	1404.3, 1404.3.1	Theresa Weston, DuPont, representing Air Barrier Association	Adds exception describing requirements for Class I and II smart vapor retarders (greater than 1 perm per ASTM E96 Procedure B) to be allowed in all climate zones	IRC Section R702.7
FS-119	1404.3, 1404.3.1, 1404.3.2, 1404.3.3, TABLE 1404.3.3	Kingston Chow, APA - The Engineered Wood Association, representing APA - The Engineered Wood Association; Borjen Yeh (same)	Reorganization (moves vapor retarder classes to first section). Redundant to the changes made in FS-117.	See FS-117
FS-120	1404.3.1, TABLE 1404.3.1 (New), 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council; Vladimir Kochkin, representing Home Innovation Research Labs	Provides continuous insulation requirements for use with Class II VR and deletes restriction to Class III only. Requires approved design for double vapor barrer (Class I on interior and exterior).	IRC Section R702.7
FS-121	1404.3.1, 1404.3.2	Mike Fischer, Kellen Company, representing The Polyisocyanurate Insulation Manufacturers Association	Focuses on deleting the Class III only limit and restores code to pre-2015.	IRC Section R702.7
FS-122	1404.3.2, 1404.3.2.1 (New), 1404.3.2.2 (New), 1404.3.2.2.1 (New), TABLE 1404.3.2	Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council	The proposal adds charging language that clarifies how the combination of different insulating methods can provide appropriate moisture control so that the total required R-Value can be achieved by continuous, cavity, or a combination of insulation strategies.	IRC Section R702.7
FS-125	TABLE 1404.3.2, 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Expands Marine 4 to all of CZ 4 and allows use of Class III in CZ 1-3.	IRC Section R702.7
FS-127	TABLE 1404.3.2	Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council	Separate CZ 8 from Climate Zone 7 to ensure consistent performance in CZ 8	IRC Section R702.7
FS-128	TABLE 1404.3.2	Craig Conner, representing self ; Joseph Lstiburek, representing Self	Same as FS127	IRC Section R702.7
FS-130	TABLE 1404.3.2	Mike Fischer, Kellen Company, representing The Center for the Polyurethanes Industry of the American Chemistry Council	Adds footnote that prevents addition of spray foam and ci R-values for energy code	IRC Section R702.7
FS-131	1404.3.3	John Woestman, Kellen Co., representing Extruded Polystyrene Foam Association (XPSA)	Improves requirements for vapor retarder paints to ensure performance by compliance with manufacturer instructions	IRC Section R702.7

Updated 4/17/2019

RB223-19: Replace Section R702.7. No changes to remainder of the code change.

RB223-19

Proponent: Rob Brooks, representing DowDuPont (rob.brooks.mail@gmail.com); Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Mike Fischer, representing The Center for the Polyurethanes Industry of the American Chemistry Council (mfischer@kellencompany.com); John Woestman, representing Extruded Polystyrene Foam Association (jwoestman@kellencompany.com)

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or Table R702.7(4) where applicable. An approved design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section N1101.7 (R301.1).

Exceptions:

1. Basement walls.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation, or freezing of moisture will not damage the materials.

RB240-19: Table R703.6.3(1) - Table was cut off in the code change.

RB240-19

Proponent: Rick Allen, International Staple, Nail and Tool Association, representing International Staple, Nail and Tool Association (rallen@isanta.org)

TABLE R703.6.3(2)
DOUBLE-COURSE SIDEWALL FASTENERS

DOUBLE-COURSE SIDEWALL FASTENERS			
Product type	**Nail type ~~and minimum~~ shank diameter and length (inches)**	**~~Minimum head diameter (inches)~~**	**~~Minimum shank thickness (inches)~~**
R & R and sanded shingles			
16,″ ~~8~~ 18″ and 24″ shingles	5d box $1^3/_4$ x 0.080 or ~~same size~~ 5d casing nails $1^3/_4$ x 0.080	~~0.19~~	~~0.08~~
Grooved shingles			
16,″ 18″ and 24″shingles	5d box $1^3/_4$ x 0.080	~~0.19~~	~~0.08~~
Split and sawn shakes			

DOUBLE-COURSE SIDEWALL FASTENERS			
Product type	**Nail type ~~and minimum~~ shank diameter and length (inches)**	**~~Minimum head diameter (inches)~~**	**~~Minimum shank thickness (inches)~~**
18″ straight-split shakes	7d box 2¼ x 0.099 or 8d box 2½ x 0.113	~~0.19~~	~~0.099~~
18″ and 24″ handsplit shakes	7d box 2¼ x 0.099 or 8d box 2½ x 0.113	~~0.19~~	~~0.099~~
24″ tapersplit shakes	7d box 2¼ x 0.099 or 8d box 2½ x 0.113	~~0.19~~	~~0.099~~
18″ and 24″ tapersawn shakes	7d box 2¼ x 0.099 or 8d box 2½ x 0.113	~~0.19~~	~~0.099~~

For SI: 1 inch = 25.4 mm.

Updated 4/17/19

RB242-19: ASTM E2556 was proposed to be added. While listed in the IBC, this standard is not currently listed in the IRC. The errata is to indicate the new standard for Chapter 44 and revise the staff analysis. No change to the remainder of the code change.

RB242-19

Proponent: Mike Fischer, representing Self (mfischer@kellencompany.com); Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

ASTM E2556/E2556M—10: Standard Specification for Vapor Permeable Flexible Sheet Water-resistive Barriers Intended for Mechanical Attachment

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM E2925-17, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.

The referenced standards, ASTM E2556/E2556M—10 is currently referenced in other 2018 I-codes.

RB244-19: Replace the proposal with the following:

RB244-19

IRC®: R703.7.3

Proponent: Craig Conner, representing self (craig.conner@mac.com); Joseph Lstiburek, representing self (joe@buildingscience.com)

2018 International Residential Code

Revise as follows:

R703.7.3 Water-resistive barriers. Water-resistive barriers shall be installed as required in Section R703.2 and, where applied over wood-based sheathing, shall include a water-resistive, vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing, installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier*, is directed between the layers.

~~Exception~~ Exceptions:

1. Where the *water-resistive barrier* that is applied over wood-based sheathing has a water resistance equal to or greater than that of 60-minute Grade D paper and is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space.
2. Where the water-resistive barrier is applied over wood-based sheathing and where the annual mean rainfall as determined from approved weather data exceeds 20 inches (508 mm), a minimum 3/16 inch (4,8 mm) space shall be provided between the stucco and the water-resistive barrier.

Reason: There are serious stucco failures occurring with wood frame buildings sheathed with wood based sheathing. The reasons for these failures can be found in the following link: https://buildingscience.com/documents/building-science-insights/bsi-102-coming-stucco-pocalypse This code change addresses these issues. Annual mean rainfall is the appropriate metric for risk not humidity and temperature.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal reduces the cost of damage, repair and associated litigation. This change gives better guidance for water resistance.

Updated 4/17/2019

RB249-19: Replace the last row of the table & footnote d with the following:

RB249-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

(Portions of the table and footnotes not shown will be as revised in the original proposal)

Table R703.11.2

ULTIMATE DESIGNWIND SPEED (MPH)	ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF)[a, b]
> 130	~~Not Allowed[d]~~ See footnote d

d. For the indicated wind speed condition~~,~~ and where foam sheathing is the~~-~~only sheathing~~-~~on the exterior of a frame walls with vinyl siding ~~is not allowed unless the vinyl siding complies with an adjusted minimum design wind pressure requirement as determined in accordance with Note b and~~ the wall assembly ~~is~~ shall be capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum $^{7}/_{16}$-inch OSB sheathing as tested in accordance with ASTM E1886. The vinyl siding shall comply with an adjusted design wind pressure requirement in accordance with footnote b, using an adjustment factor of 2.67.

Updated 4/17/2019

RB251-19: Table R703.15.1 - Table was cut off in the code change. Footnote b has been replaced. No change to remainder of code change

RB251-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

Portions of table not shown remain unchanged.

TABLE R703.15.1
CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING[b]	CLADDING FASTENER TYPE AND MINIMUM SIZE [b, c]	CLADDING FASTENERVERTICALSPACING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[c,d] (inches)							
			16″ o.c. Fastener Horizontal Spacing				24″ o.c. Fastener Horizontal Spacing			
			Cladding Weight:				Cladding Weight:			
			3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.

a. Wood framing shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.
b. The thickness of wood structural panels complying with the specific gravity requirement of footnote a shall be permitted to be included in satisfying the minimum penetration into framing. For cladding connections to wood structural panels, refer to Table R703.3.3.

~~b.~~c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
~~c.~~d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

RB252-19: Tables R703.15.1 and R703.16.2 were cut off in the code change

RB252-19

Proponent: Charles Clark Jr, representing Brick Industry Association (cclark@bia.org)

TABLE R703.15.1
CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

CLADDING FASTENER THROUGH FOAM SHEATHING	CLADDING FASTENER TYPE AND MINIMUM SIZE[b]	CLADDING FASTENER VERTICAL SPACING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[c] (inches)									
			16″ o.c. Fastener Horizontal Spacing					24″ o.c. Fastener Horizontal Spacing				
			Cladding Weight:					Cladding Weight:				
			3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf
Wood framing (minimum $1^1/_4$-inch penetration)	0.113″ diameternail	6	2.00	1.45	1.00	0.75	DR	2.00	0.85	0.55	DR	DR
		8	2.00	1.00	0.65	DR	DR	2.00	0.55	DR	DR	DR
		12	2.00	0.55	DR	DR	DR	1.85	DR	DR	DR	DR
	0.120″ diameternail	6	3.00	1.70	1.15	0.90	0.55	3.00	1.05	0.65	0.50	DR
		8	3.00	1.20	0.80	0.60	DR	3.00	0.70	DR	DR	DR
		12	3.00	0.70	DR	DR	DR	2.15	DR	DR	DR	DR
	0.131″ diameternail	6	4.00	2.15	1.50	1.20	0.75	4.00	1.35	0.90	0.70	DR
		8	4.00	1.55	1.05	0.80	DR	4.00	0.90	0.55	DR	DR
		12	4.00	0.90	0.55	DR	DR	2.70	0.50	DR	DR	DR
	0.162″ diameternail	6	4.00	3.55	2.50	2.05	1.40	4.00	2.25	1.55	1.25	0.80
		8	4.00	2.55	1.80	1.45	0.95	4.00	1.60	1.10	0.85	0.50
		12	4.00	1.60	1.10	0.85	0.50	4.00	0.95	0.60	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.

a. Wood framing shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c.. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

TABLE R703.16.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

FURRING MATERIAL	FRAMING MEMBER	FASTENER TYPE AND MINIMUM SIZE[b]	MINIMUM PENETRATION INTO WALL FRAMING (inches)	FASTENER SPACING IN FURRING (inches)	MAXIMUM THICKNESS OF FOAM SHEATHING[d] (inches)									
					16″ o.c. Furring[e]					24″ o.c. Furring[e]				
					Cladding Weight:					Cladding Weight:				
					3 psf	11 psf	15 psf	18 psf	25 psf	3 psf	11 psf	15 psf	18 psf	25 psf
Minimum 33-mil steel furring or minimum 1× wood furring[c]	33-milsteel stud	No. 8 screw	Steel thickness + 3threads	12	3.00	1.80	0.95	DR	DR	3.00	0.65	DR	DR	DR
				16	3.00	1.00	DR	DR	DR	2.85	DR	DR	DR	DR
				24	2.85	DR	DR	DR	DR	2.20	DR	DR	DR	DR
		No. 10 screw	Steel thickness + 3threads	12	4.00	2.25	1.35	0.70	DR	3.70	1.05	DR	DR	DR
				16	3.85	1.45	DR	DR	DR	3.40	DR	DR	DR	DR
				24	3.40	DR	DR	DR	DR	2.70	DR	DR	DR	DR
	43-milor thickersteel stud	No. 8 Screw	Steel thickness + 3threads	12	3.00	1.80	2.00	DR	DR	3.00	0.65	DR	DR	DR
				16	3.00	1.00	1.30	DR	DR	2.85	DR	DR	DR	DR
				24	2.85	DR	DR	DR	DR	2.20	DR	DR	DR	DR
		No. 10 screw	Steel thickness + 3threads	12	4.00	3.85	3.25	2.80	1.80	4.00	3.05	2.15	1.50	DR
				16	4.00	3.30	2.55	1.95	0.60	4.00	2.25	1.05	DR	DR
				24	4.00	2.25	1.05	DR	DR	4.00	0.65	DR	DR	DR

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.

a. Wood furring shall be Spruce-pine-fir or any softwood species with a specific gravity of 0.42 or greater. Steel furring shall be minimum 33-ksi steel. Steel studs shall be minimum 33-ksi steel for 33-mil and 43-mil thickness, and 50-ksi steel for 54-mil steel or thicker.
b. Screws shall comply with the requirements of ASTM C1513.
c. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.
d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
e. Furring shall be spaced not more than 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

Updated 4/17/2019

RB253-19: Table R703.15.2 - Table was cut off in the code change. Footnote c has been replaced. No change to remainder of code change

RB253-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

TABLE R703.15.2
FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

					16″ o.c. Furring ~~e~~ f				24″ o.c. Furring e f			
					Siding Weight:				Siding Weight:			
					3 psf	11 psf	18 psf	25 psf	3 psf	11 psf	18 psf	25 psf
Minimum 1× wood furring ~~c~~ d	Minimum 2 woodstud	0.131″ diameternail	1 1/4	8	4.00	2.45	1.45	0.95	4.00	1.60	0.85	DR
				12	4.00	1.60	0.85	DR	4.00	0.95	DR	DR
				16	4.00	1.10	DR	DR	3.05	0.60	DR	DR
		0.162″ diameternail	1 1/4	8	4.00	4.00	2.45	1.60	4.00	2.75	1.45	0.85
				12	4.00	2.75	1.45	0.85	4.00	1.65	0.75	DR
				16	4.00	1.90	0.95	DR	4.00	1.05	DR	DR
		No.10 woodscrew	1	12	4.00	2.30	1.20	0.70	4.00	1.40	0.60	DR
				16	4.00	1.65	0.75	DR	4.00	0.90	DR	DR
				24	4.00	0.90	DR	DR	2.85	DR	DR	DR
		1/4″ lag screw	1 1/2	12	4.00	2.65	1.50	0.90	4.00	1.65	0.80	DR
				16	4.00	1.95	0.95	0.50	4.00	1.10	DR	DR
				24	4.00	1.10	DR	DR	3.25	0.50	DR	DR

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.
DR = Design Required.
o.c. = On Center.

a. Wood framing and furring shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.
b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
c. The thickness of wood structural panels complying with the specific gravity requirement of footnote a shall be permitted to be included in satisfying the minimum required penetration into framing.
d. Where the required cladding fastener penetration into wood material exceeds 3/4 inch and is not more than 1 1/2 inches, a minimum 2× wood furring or an approved design shall be used.
e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
f. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required

fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

RB292-19: Remove Staff Analysis from code change proposal

RB292-19

Proponent: Hope Medina, representing Self (hmedina@coloradocode.net)

~~**Staff Analysis:** A review of the standards proposed for inclusion in the code, RESNE/ICC 380, ASTM E779 and ASTM E1827, with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2019.~~

RB295-19: Table AR103.2.3 - Table was cut off in the code change.

RB295-19

Proponent: Jay Crandell, P.E., ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council

TABLE AR103.2.3
REQUIREMENTS AND PROPERTIES OF LIGHT STRAW-CLAY MIXTURES[a]

Density(pcf)	Straw(pcf)	Subsoil(pcf)	Water(gal/cf)[b]	Min.% clayin subsoil	Minimum clay: silt ratio	Subsoil testing method[c, d]	Max. wall thickness, inches	R-value(hr/F°/cf/BTU/inch)
10	6.7	3.3	1.55	70	3.5:1	A	15	1.80
12	6.7	5.3	1.63	46	1.7:1	A	15	1.72
13	6.7	6.3	1.67	40	1.33:1	A	15	1.69
15	6.7	8.3	1.74	35	0.95:1	A	15	1.63
20	6.7	13.3	1.93	30	0.60:1	A	12	1.48
30	6.7	23.3	2.31	NA	NA	B	12	1.22
40	6.7	33.3	2.70	NA	NA	B	12	1.01
50	6.7	43.3	3.08	NA	NA	B	12	0.84

a. Interpolation permitted. Extrapolation not permitted.
b. Water mixed with subsoil equals clay slip.
c. Subsoil Testing Methods:
A. Lab test for percent of clay, silt and sand via hydrometer method.
B. The Figure 2 Ribbon Test ~~or~~ and the Figure 3 Ball Test in the Appendix of ASTM E2392/E2392M.
d. Trace amounts of organic materials are acceptable.

RB296-19: Table AS105.4 - Table was cut off in the code change.

RB296-19

Proponent: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT, representing DCAT (strawnet@gmail.com); David Arkin, representing California Straw Building Association (info@strawbuilding.org); Ian Smith, representing Colorado Straw Bale Association (ian@lopezsmolensengineers.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

TABLE AS105.4
OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL DIMENSION LIMITS

METHOD OFOUT-OF-PLANE LOAD RESISTANCE[a]	FOR ULTIMATE DESIGN WIND SPEEDS(mph)	FOR SEISMICDE SIGN CATEGORIES	UNRESTRAINED WALL DIMENSIONS, H[b]		MESH STAPLE SPACING AT BOUNDARY RESTRAINTS
			Absolute limit in feet	Limit based on bale thickness T[c]in feet (mm)	
Nonplaster finish or unreinforced plaster	≤ 130	A, B, C, D_0	H ≤ 8	H ≤ 5T	None required
Pins per Section AS105.4.2	≤ 130	A, B, C, D_0	H ≤ 12	H ≤ 8T	None required
Pins per Section AS105.4.2	≤ 140	A, B, C,D_0, D_1, D_2	H ≤ 10	H ≤ 7T	None required
Reinforced[d] clay plaster	≤ 140	A, B, C,D_0, D_1, D_2	H ≤ 10	H ≤ $8T^{0.5}$ (H ≤ $140T^{0.5}$)	≤ 6 inches
Reinforced[d] clay plaster	≤ 140	A, B, C,D_0, D_1, D_2	10 < H ≤ 12	H ≤ $8T^{0.5}$ (H ≤ $140T^{0.5}$)	≤ 4 inches[e]
Reinforced[d] cement, cement-lime, limeor soil-cement plaster	≤ 140	A, B, C,D_0, D_1, D_2	H ≤ 10	H ≤ $9T^{0.5}$ (H ≤ $157T^{0.5}$)	≤ 6 inches
Reinforced[d] cement, cement-lime, limeor soil-cement plaster	≤ 155	A, B, C,D_0, D_1, D_2	H ≤ 12	H ≤ $9T^{0.5}$ (H ≤ $157T^{0.5}$)	≤ 4 inches[e]
2×6 load-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C,D_0, D_1, D_2	H[g] ≤ 9	N/A	None required
2×6 load-bearing wood studs[f] at max. 4′ o.c.	≤ 140	A, B, C,D_0, D_1, D_2	H[g] ≤ 10	N/A	None required
2×6 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C,D_0, D_1, D_2	H[g] ≤ 12	N/A	None required

METHOD OFOUT-OF-PLANE LOAD RESISTANCE[a]	FOR ULTIMATE DESIGN WIND SPEEDS(mph)	FOR SEISMICDE SIGN CATEGORIES	UNRESTRAINED WALL DIMENSIONS, H[b]		MESH STAPLE SPACING AT BOUNDARY RESTRAINTS
			Absolute limit in feet	Limit based on bale thickness T[c]in feet (mm)	
2×4 load-bearing wood studs[f] at max. 2′ o.c.	≤ 140	A, B, C,D_0, D_1, D_2	H[g] ≤ 10	N/A	None required
2×6 nonload-bearing wood studs[f] at max. 6′ o.c.	≤ 140	A, B, C,D_0, D_1, D_2	H[g] ≤ 12	N/A	None required

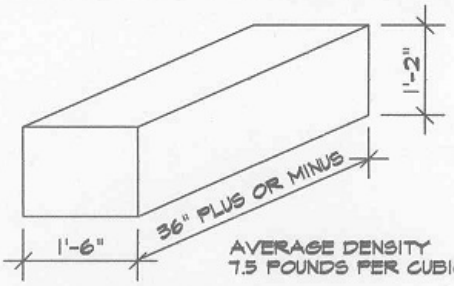
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.
N/A = Not Applicable

a. Finishes applied to both sides of stacked bales. Where different finishes are used on opposite sides of a wall, the more restrictive requirements shall apply.
b. *H* = Stacked bale height in feet (mm) between sill plate and top plate or other approved horizontal restraint, or the horizontal distance in feet (mm) between *approved* vertical restraints. For load-bearing walls, *H* refers to vertical height only.
c. *T* = Bale thickness in feet (mm).
d. Plaster reinforcement shall be any mesh allowed in Table AS106.16 for the matching plaster type, and with staple spacing in accordance with this table. Mesh shall be installed in accordance with Section AS106.9.
e. Sill plate attachment shall be with $^5/_8$-inch anchor bolts or *approved* equivalent at not more than 48 inches on center where staple spacing is required to be ≤ 4 inches.
f. Bales shall be attached to the studs by an approved method. Horizontal framing and attachment at top and bottom of studs shall be in accordance with Section R602 or an *approved* alternative. Table R602.7(1) shall be used to determine the top framing member where load-bearing stud spacing exceeds 24 inches o.c.
g. H is vertical height only.

RB298-19: The image in the reason statement was cut off.

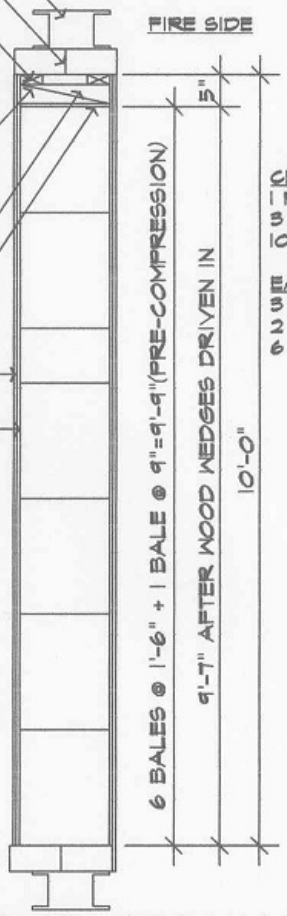
RB298-19

Proponent: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, DCAT, representing DCAT (strawnet@gmail.com); David Arkin, representing California Straw Building Association (info@strawbuilding.org)



AVERAGE DENSITY
7.5 POUNDS PER CUBIC FOOT

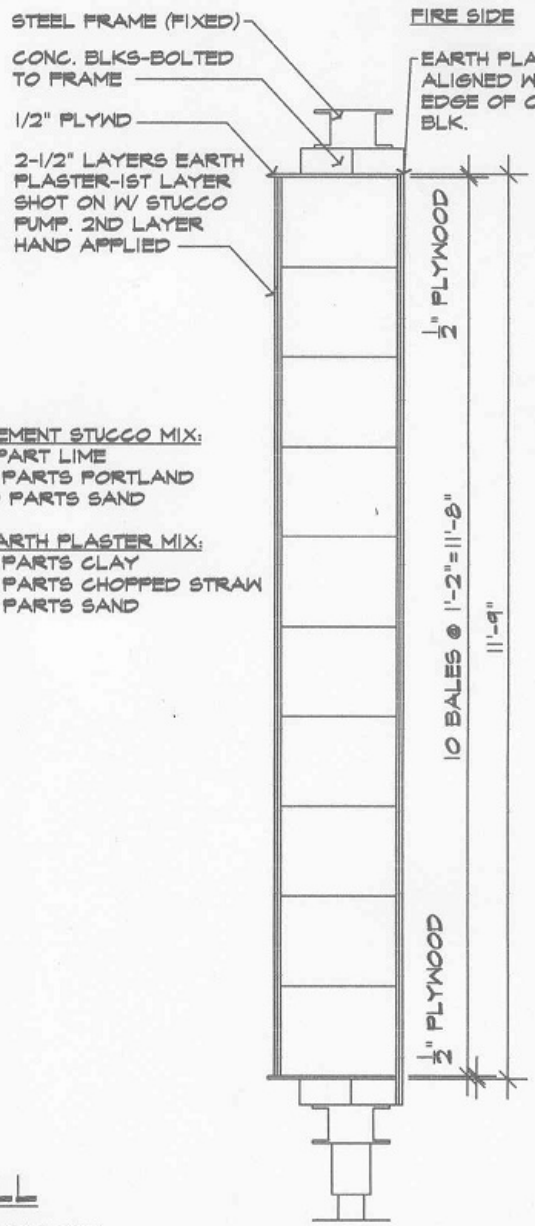
'AVERAGE' BALE



CEMENT STUCCO MIX:
1 PART LIME
3 PARTS PORTLAND
10 PARTS SAND

EARTH PLASTER MIX:
3 PARTS CLAY
2 PARTS CHOPPED STRAW
6 PARTS SAND

CEMENT STUCCO WALL



AFTER SCRATCH COAT WAS APPLIED, WALL WAS 'WETTED' DOWN ON BOTH SIDES. 6 MIL POLY WAS THEN WRAPPED OVER STRUCTURE AND TAPED TO THE FRAME TO HOLD MOISTURE IN.

EARTH PLASTER WALL

0' 6" 1' 2' 3' 4' 5'

THE SUSTAINABLE DESIGN CENTER 15429 OVERLAND PASS, AUSTIN TEXAS 78738
OFFICE: 512) 263-0177 FAX: 512) 263-5765 WEB: SUSTAINABLEDESIGNCENTER.COM E-MAIL: SDC@AUSTIN.RR.COM

RB302-19: The new reference standard does not belong in Chapter 44, it has been moved to Section U106

RB302-19

Proponent: Jonathan Roberts, UL LLC, representing UL LLC (jonathan.roberts@ul.com)

SECTION U106
REFERENCED STANDARDS

UL 3401-19 Outline of Investigation for 3D Printed Building Construction

CODE CORRELATION COMMITTEE

Updated April 2, 2019

CCC-ADM1-19: Added proponent to the code change

CCC-ADM1-19

Proponent: Ed Kulik, representing ICC Building Code Action Committee (bcac@iccsafe.org); Pennie Feehan, representing Plumbing, Mechanical, and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); David Collins, representing SEHPCAC (sehpcac@iccsafe.org)