International Energy Conservation Code
Consensus Committee-Residential

Draft Meeting Agenda (8/25/23 posting-update)

Webex Meeting Link

August 31, 2023
2:00 - 5:00 PM Eastern

Committee Chair: JC Hudgison, CBO, Assoc. AIA
Committee Vice Chair: Bridget Herring

1. Call to order.

2. Meeting Conduct.
   a. Identification of Representation/Conflict of Interest
   b. ICC Council Policy 7 Committees: Section 5.1.10 Representation of Interests
   c. ICC Code of Ethics: ICC advocates commitment to a standard of professional behavior that exemplifies the highest ideals and principles of ethical conduct which include integrity, honesty, and fairness. As part of this commitment it is expected that participants shall act with courtesy, competence and respect for others.
   d. ICC Antitrust Compliance Guideline

3. Roll Call.

4. Approve Agenda

5. Approve Minutes-August 17, 2023 meeting

6. Administrative issues-staff

7. Action Items-

RE2D-45-23(Building thermal envelope)	Existing building disapprove 3-2
RE2D-47-23(Floor alterations)	Existing building disapprove 5-0
RE2D-46-23(Above-grade wall alteration)	Existing building as modified 6-1-1
RE2D-48-23(Below-grade wall alteration)	Existing building disapprove 7-0
RE2D-27-23(Air leakage reference)	Envelope disapprove 16-1-0
RE2D-33-23(Table R407.1 footnote ref change)	Envelope approve 13-0-4
RE2D-39-23(Coordination with Table R408.2)	Envelope approve 10-0-7
RE2D-36-23(AFUE credit for R408.2 table)	Modeling disapprove 11-0-5
RE2D-37-23(R408.2 table footnote c)	Modeling as modified 14-0-0

RE2D-53-23(Remove Appendix RG)	Modeling disapprove 11-0-3
RE2D-54-23(Remove Appendix RH)	Modeling disapprove 13-0-1
RE2D-30-23(Remove ERI w/OPP)	Modeling disapprove 13-1-0
REC2D-4-23(Table R405 edits)	Modeling approve 14-0-0
RE2D-38-23(Roof reflectance)	Modeling as modified 14-0-0
RE2D-44-23(Energy efficient appliances edit)	Modeling as modified 9-0-5

Confirm recommendation of IECC R Project on Public Comments to RECD1-13-22. Follow link to recommendation package

8. Other business.

9. Upcoming meetings. Thursday, September 7 at 2 pm Eastern

10. Adjourn.

FOR FURTHER IECC Residential INFORMATION BE SURE TO VISIT THE ICC WEBSITE:
IECC Residential Website

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:
Kristopher Stenger, AIA, CBO
Director of Energy Programs
International Code Council
kstenger@iccsafe.org

Join by meeting number

Meeting number (access code): 2597 702 0320

Meeting password: uGvZqpTd984

Tap to join from a mobile device (attendees only)

1-844-740-1264,,25977020320## USA Toll Free

+1-415-655-0003,,25977020320## US Toll

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-45-23 Building thermal envelope
CDP ID #	1644
Code	IECC RE
Code Section(s)	R503.1.1
Location	SC rev
Proponent	Lucyna de Barbaro ldbarbaro@rtpittsburgh.org
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	Initial motion was to approve as submitted. The committee discussion centered around the fact that the added language was more confusing than clarifying. Motion failed 2-3
Recommendation	Motion to disapprove. Reason: Proposal does not clarify and confuses the Code, so the Proposal does not meet its intent.
Vote	3-2 in favor of disapproval
Recommendation Date	8/17/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-47-23 Floor alterations
CDP ID #	1647
Code	IECC RE
Code Section(s)	R503.1.1.4
Location	SC rev
Proponent	Lucyna de Barbaro ldbarbaro@rtpittsburgh.org
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	
Recommendation	Motion to Disapprove Reason statement: Proposal would likely significantly increase cost of construction contrary to its reason statement, is substantive rather than clerical in manner so is outside the understood purview of Code development at this point in the process, and does not clarify the intent of the existing Code
Vote	5-0 in favor of disapproval
Recommendation Date	8/17/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code

Code Change Proposal Tracking Sheet

Proposal #	RE2D-46-23 Above-grade wall alteration
CDP ID #	1787
Code	IECC RE
Code Section(s)	R503.1.1.3
Location	SC rev
Proponent	Amy Martino amartino@buildingsitesynergy.com
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	Motion AM: Add "as applicable" after "following" at the beginning of the section, remove "and" from the 1st sentence of item #1, and keep "continuous" in section #2
Recommendation	**As Modified by the committee. 8/22/2023**

R503.1.1.3 Above-grade wall alterations.

Above-grade wall alterations shall comply with the following as applicable:

1. Where wall cavities are exposed, ~~and~~ the exposed cavities shall be filled with insulation complying with Section R303.1.4. New cavities created shall be insulated in accordance with Section R402.1 or an *approved* design that minimizes deviation from Section R402.1. An interior vapor retarder shall be provided where required in accordance with Section R702.7 of the *International Residential Code* or Section 1404.3 of the *International Building Code*, as applicable.
2. Where *exterior wall* coverings and *fenestration* are added or replaced for the full extent of any exterior ~~,~~ facade of one or more elevations of the *building*, continuous insulation shall be provided where required in accordance with Section R402.1 or the wall insulation shall be in accordance with an *approved* design ~~,~~ that minimizes deviation from Section R402.1; Where specified, the continuous insulation requirement also shall comply with Section R702.7 of the *International Residential Code*. Replacement exterior wall coverings shall comply with the water resistance requirements of Section R703.1.1 of the *International Residential Code* or Section 1402.2 of the *International Building Code*, as applicable, *and manufacturers' instructions.*

	3. Where new interior finishes or *exterior wall* coverings are applied to the full extent of any exterior wall assembly of mass construction, insulation shall be provided in accordance with Section R402.1 or an approved design that minimizes deviation from Section R402.1.
Vote	Vote: 6-1 motion passes
Recommendation Date	8/23/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-48-23 Below-grade wall alterations
CDP ID #	1806
Code	IECC RE
Code Section(s)	R503.1.1.5
Location	SC rev
Proponent	Amy Martino amartino@buildingsitesynergy.com
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	
Recommendation	Motion to Disapprove: The proposal would likely significantly decrease energy efficiency and would likely create moisture condensation problems
Vote	7-0 Motion Passes
Recommendation Date	8/23/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-27-23 Air leakage reference
CDP ID #	1613
Code	IECC RE
Code Section(s)	R405.4.2(1) table
Location	SC rev
Proponent	Theresa Weston holtweston88@gmail.com
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Moved to 8/9
Recommendation	Need to keep the reference to ensure consistency and parity. Double-counting is not an issue and deleting the language could cause confusion.
Vote	16-1-0 for disapproval
Recommendation Date	8/9/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-33-23 Table R407.1 footnote ref change
CDP ID #	1611
Code	IECC RE
Code Section(s)	R407.2 Table
Location	SC rev
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	
Recommendation	To maintain references internally in IECC-R instead of referring to IECC-C
Vote	13-0-4 for approval
Recommendation Date	8/9/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-39-23 Coordination with Table R408.2
CDP ID #	1788
Code	IECC RE
Code Section(s)	R408.2.1.3
Location	SC rev
Proponent	Aaron Phillips aphillips@asphaltroofing.org
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	
Recommendation	The climate zones in R408.2.1.3, which are associated with the roof reflectance additional energy efficiency credits in Table R408.2, are revised to align with the climate zones determined to qualify for a roof reflectance credit via PNNL's analysis.
Vote	10-0-7 for Approval
Recommendation Date	8/9/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-36-23 AFUE credit for R408.2 table
CDP ID #	1781
Code	IECC RE
Code Section(s)	R408.2 table
Location	
Proponent	Alex Smith asmith@npga.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion for Disapproval Gayathri Vijayakumar; 2nd Rob Salcido
Recommendation	The Subcommittee discussed the proposed addition of another high-performance gas furnace measure in R408.2.2. Based on the raw results shared by PNNL in June, this measure is likely going to have the same points as the current measure for 97 AFUE. The SC voted against adding another measure. SC Action: Disapprove
Vote	DISAPPROVE: 11 YES; 0 NO; 2 ABSTAIN
Recommendation Date	August 15, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-37-23 R408.2 table footnote c
CDP ID #	1735
Code	IECC RE
Code Section(s)	R408.2 table
Location	
Proponent	Alisa McMahon mcmahon.gbac@cox.net
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion for Approval as Modified by 1a Gayathri Vijayakumar; 2nd Shilpa Surana
Recommendation	The Subcommittee discussed the proposed changes and agreed that the editorial changes improve the section. SC Action: Approve as Modified by 1a
Vote	APPROVE AS MODIFIED: 14 YES; 0 NO; 0 ABSTAIN
Recommendation Date	August 15, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RE2D-37-23 Modification 1a

note: legislative edits are shown against PCD#2

Revise as follows:

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Portions of table not shown remain unchanged.

Measure Number	Measure Description
~~R408.2.3.1[c]~~ R408.2.3(8)[c]	Compact hot water distribution
R408.2.4(1)[c]	~~More efficient distribution system~~ Ductless or hydronic thermal distribution
R408.2.4(2)[c]	100% of *duct systems* in *conditioned space* ducts in
R408.2.4(3)[c]	≥80% of *ductwork* inside *conditioned space*
R408.2.4(4)[c]	Reduced total *duct system* leakage

a. Where the measure is selected, each dwelling unit, sleeping unit, and common area ~~areas~~ must have the measure installed.

~~SEER2: Seasonal Energy Efficiency Ratio, HSPF2: Heating Season Performance Factor, EER2: Energy Efficiency Ratio, COP: Coefficient of Performance~~

R408.2.1 Enhanced building thermal envelope options.

~~For the enhanced envelope credits, the~~ The *building thermal envelope* shall comply with one or more of the following:

R408.2.1.1 Enhanced building thermal envelope performance.

The total *building thermal envelope* thermal conductance TC shall be calculated for the proposed *building* in accordance with Section R402.1.5 and ~~it~~ shall be reduced by not less than the percentage indicated in Table R408.2 in comparison to the reference *building*.

R408.2.1.4 Reduced air leakage.

~~For the reduced air leakage credit, the~~ The building shall have a measured air leakage rate no less than 2.0 ACH50 and no greater than 2.5 ACH50 or the dwelling units in the building shall have an average measured air leakage rate no greater than 0.24 cfm50/ft2.

R408.2.2 More efficient HVAC equipment performance options.

Heating and cooling equipment shall meet one of the following ~~efficiencies~~ measures as applicable for the *climate zone*~~.~~, where heating and cooling efficiencies are represented by Annual Fuel Utilization Efficiency (AFUE), Coefficient of Performance (COP), Energy Efficiency Ratio (EER and EER2), Heating Season Performance Factor (HSPF2), and Seasonal

Energy Efficiency Ratio (SEER2). Where multiple heating or cooling systems are installed serving different zones, credits shall be earned based on the weighted average of square footage of the *zone* served by the system.

R408.2.3 Reduced energy use in service water-heating options.

For measure numbers R408.2.3(1) through R408.2.3(7), the installed hot water system shall meet one of the Uniform Energy Factors (UEF) or Solar Uniform Energy Factors (SUEF) in Table R408.2.3. For measure number R408.2.3(8), the ~~*dwelling unit*~~ hot water distribution system shall comply with R408.2.3.1.

R408.2.4 More efficient duct thermal distribution system options.

R408.2.5 Improved air sealing and efficient ventilation system options.

The measured air leakage rate and *ventilation* system shall meet one of the following:

1. Either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed.
2. Less than or equal to 2.0 ACH50, with either an ERV or HRV installed.
3. Less than or equal to 2.0 ACH50, with a *balanced ventilation system*.
4. Less than or equal to 1.5 ACH50, with either an ERV or HRV installed.
5. Less than or equal to 1.0 ACH50, with either an ERV or HRV installed.

Reason Statement

1. Section R408.2.2: Replaces the abbreviations proposed to be stricken under Table R408.2 and locates them in the appropriate section.

2. R408.2.4(1) description: Section R408.2.4 is titled "More efficient thermal distribution system option" and contains four "more efficient distribution system" options. The proposed description more specifically describes the first option.

3. R408.2.4(4) description: The addition of "system" and italicization of "duct system" is consistent with changes made to Section R408.2.4(4) by RED1-285 in the last round.

4. The rest are obvious editorial changes that provide consistency between the R408 sections.

Cost Impact

The code change proposal will neither increase nor decrease the cost of construction.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-53-23 Remove Appendix RG
CDP ID #	1838
Code	IECC RE
Code Section(s)	Appendix RG
Location	
Proponent	Eric Tate eric.tate@atmosenergy.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion for Disapproval Gayathri Vijayakumar; 2nd Ben Edwards
Recommendation	The Sub-Committee approved the addition of the Stretch Code appendix in the last round to provide AHJs with options to exceed the requirements of the main body if that aligned with their local climate policy goals. The proponent didn't provide specific changes to resolve their objections to the existence of this optional Appendix. SC Action: Disapprove
Vote	DISAPPROVE: 11 YES; 0 NO; 3 ABSTAIN
Recommendation Date	August 15, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-54-23 Remove Appendix RH
CDP ID #	1839
Code	IECC RE
Code Section(s)	Appendix RH
Location	
Proponent	Eric Tate eric.tate@atmosenergy.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion for Disapproval Gayathri Vijayakumar; 2nd Ben Edwards
Recommendation	The Sub-Committee approved the addition of the Carbon Rating appendix in the last round to provide AHJs with options to shift the focus of their requirements to reducing GHG emissions, rather than just energy. The proponent didn't provide specific changes to resolve their objections to the existence of the optional Appendix. SC Action: Disapprove
Vote	DISAPPROVE: 13 YES; 0 NO; 1 ABSTAIN
Recommendation Date	August 15, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-30-23 Remove ERI w OPP
CDP ID #	1824
Code	IECC RE
Code Section(s)	R406.5 table
Location	
Proponent	Eric Tate eric.tate@atmosenergy.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	
Vote	disapprove
Recommendation Date	8/22/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

REC2D-4-23

IECC RE: TABLE R405.4.2(1)

Proponents:

Jay Crandell, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Energy Code [RE] [RE Project] R3

Revise as follows:

TABLE R405.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS
Portions of table not shown remain unchanged.

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass where the proposed wall is a mass wall; otherwise wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.2.	As proposed
	Solar reflectance = 0.25.	As proposed
	Emittance = 0.90.	As proposed
Basement and crawl space walls	Type: same as proposed.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.2 , with the insulation layer on the interior side of the walls.	As proposed
Above-grade floors	Type: wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.2.	As proposed
Ceilings	Type: wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.2.	As proposed
Roofs	Type: composition shingle on wood sheathing.	As proposed
	Gross area: same as proposed.	As proposed
	Solar reflectance = 0.25.	As proposed
	Emittance = 0.90.	As proposed
Attics	Type: vented with an aperture of 1 ft^2 per 300 ft^2 of ceiling area.	As proposed
Foundations	Type: same as proposed.	As proposed

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
	Foundation wall ~~or slab~~ extenstion above and below grade: same as proposed ~~+ foot (30 cm)~~ ~~Foundation wall or slab extension below grade: same as proposed~~ Foundation wall or slab perimeter length: same as proposed Soil characteristics: same as proposed.	As proposed
	Foundation wall *U*-factor and slab-on-grade *F*-factor: as specified in Table R402.1.2	
Opaque doors	Area: 40 ft^2.	As proposed
	Orientation: North.	As proposed
	U-factor: same as fenestration as specified in Table R402.1.2 .	As proposed
Vertical fenestration other than opaque doors	Total area[h] = (a) The proposed glazing area, where the proposed glazing area is less than 15 percent of the conditioned floor area. (b) 15 percent of the conditioned floor area, where the proposed glazing area is 15 percent or more of the conditioned floor area.	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: as specified in Table R402.1.2.	As proposed
	SHGC: as specified in Table R402.1.2 except for climate zones without an SHGC requirement, the SHGC shall be equal to 0.40.	As proposed
	Interior shade fraction: 0.92 – (0.21 × SHGC for the standard reference design).	Interior shade fraction: 0.92 – (0.21 × SHGC as proposed)
	External shading: none	As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air leakage rate	For detached one-family dwellings, the air leakage rate at a pressure of 0.2 inch water gauge (50 Pa) shall be Climate Zones 0 through 2: 4.0 air changes per hour. Climate Zones 3 , 4, and 5: 3.0 air changes per hour. Climate Zones 6 through 8: 2.5 air changes per hour. For detached one-family dwellings that are 1,500 ft2 (139.4 m^2) or smaller and attached *dwelling units*, the *air leakage* rate at a pressure of 0.2 inch water gauge (50 Pa) shall be 0.27 cfm/ft^2 of the *dwelling unit enclosure area*.	The measured air leakage rate.[a]
Mechanical ventilation rate	-	

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
	The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than B x M where: B = 0.01 × CFA + 7.5 × (Nbr + 1), cfm. M = 1.0 where the measured air leakage rate is > = 3.0 air changes per hour at 50 Pascals, and otherwise, M = minimum (1.7, Q/B) Q = the proposed mechanical ventilation rate, cfm. CFA = conditioned floor area, ft2. Nbr = number of bedrooms.	The measured mechanical ventilation rate[b], Q, shall be in addition to the measured air leakage rate .
Mechanical ventilation fan energy	The mechanical ventilation system type shall be the same as in the *proposed design*. Heat recovery or energy recovery shall be modeled for mechanical ventilation where required by Section R403.6.1. Heat recovery or energy recovery shall not be modeled for mechanical ventilation where not required by Section R403.6.1.Where mechanical ventilation is not specified in the *proposed design*: None Where mechanical ventilation is specified in the proposed design, the annual vent fan energy use, in units of kWh/yr, shall equal (8.76 × B × M)/ef where: B and M are determined in accordance with the Mechanical Ventilation Rate row of this table. e_f = the minimum fan efficacy, as specified in Table 403.6.2, corresponding to the system type at a flow rate of B × M. *CFA* = conditioned floor area, ft^2. N_{br} = number of bedrooms.	As proposed
Internal gains	IGain, in units of Btu/day per dwelling unit, shall equal 17,900 + 23.8 ×*CFA* + 4,104 × N_{br} where: *CFA* = conditioned floor area, ft^2. N_{br} = number of bedrooms.	Same as *standard reference design*.
Internal mass	Internal mass for furniture and contents: 8 pounds per square foot of floor area.	Same as *standard reference design*, plus any additional mass specifically designed as a thermal storage element[c] but not integral to the *building thermal envelope* or structure.
Structural mass	For masonry floor slabs: 80 percent of floor area covered by R-2 carpet and pad, and 20 percent of floor directly exposed to room air.	As proposed
	For masonry basement walls: as proposed, but with insulation as specified in Table R402.1.3, located on the interior side of the walls.	As proposed

<table>
<tr><th>BUILDING COMPONENT</th><th>STANDARD REFERENCE DESIGN</th><th>PROPOSED DESIGN</th></tr>
<tr><td></td><td>For other walls, ceilings, floors, and interior walls: wood frame construction.</td><td>As proposed</td></tr>
<tr><td rowspan="6">Heating systems[d, e, j, k]</td><td>Fuel Type/Capacity: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Product class: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Efficiencies:</td><td>As proposed</td></tr>
<tr><td>Heat pump: Complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td>Fuel gas and liquid fuel furnaces: Complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td>Fuel gas and liquid fuel boilers: Complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td rowspan="2">Cooling systems[d, f, k]</td><td>Fuel Type: Electric
Capacity: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Efficiencies: Complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td rowspan="11">Service water heating[d, g, k]</td><td rowspan="6">Use, in units of gal/day = 25.5 + (8.5 × N_{br})
where: N_{br} = number of bedrooms.</td><td>Use, in units of gal/day = 25.5 + (8.5 × N_{br}) × (1 − HWDS)
where:
N_{br} = number of bedrooms.
HWDS = factor for the compactness of the hot water distribution system.
<table>
<tr><th colspan="2">Compactness ratio[i] factor</th><th>HWDS factor</th></tr>
<tr><td>1 story</td><td>2 or more stories</td><td></td></tr>
<tr><td>> 60%</td><td>> 30%</td><td>0</td></tr>
<tr><td>> 30% to ≤ 60%</td><td>> 15% to ≤ 30%</td><td>0.05</td></tr>
<tr><td>> 15% to ≤ 30%</td><td>> 7.5% to ≤ 15%</td><td>0.10</td></tr>
<tr><td>< 15%</td><td>< 7.5%</td><td>0.15</td></tr>
</table></td></tr>
<tr><td></td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr>
<tr><td>Fuel Type: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Rated Storage Volume: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Draw Pattern: Same as proposed design</td><td>As proposed</td></tr>
<tr><td>Efficiencies: Uniform Energy Factor complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td></td><td></td></tr>
</table>

<table>
<tr><th>BUILDING COMPONENT</th><th colspan="4">STANDARD REFERENCE DESIGN</th><th>PROPOSED DESIGN</th></tr>
<tr><td></td><td colspan="4">Tank Temperature: 120° F (48.9° C)</td><td>Same as standard reference design</td></tr>
<tr><td rowspan="4">Thermal distribution systems</td><td colspan="4">Duct location:</td><td rowspan="3">Duct location: as proposed[l] .</td></tr>
<tr><td>Foundation Type</td><td>Slab on grade</td><td>Unconditioned crawl space</td><td>Basement or conditioned crawl space</td></tr>
<tr><td>Duct location (supply and return)</td><td>One-story building: 100% in unconditioned attic

All other: 75% in unconditioned attic and 25% inside conditioned space</td><td>One-story building: 100% in unconditioned crawlspace

All other: 75% in unconditioned crawlspace and 25% inside conditioned space</td><td>75 % inside conditioned space

25 % unconditioned attic</td></tr>
<tr><td colspan="4">Duct insulation: in accordance with Section R403.3.1.</td><td>Duct insulation: as proposed[m] .</td></tr>
</table>

<table>
<tr><th>BUILDING COMPONENT</th><th>STANDARD REFERENCE DESIGN</th><th>PROPOSED DESIGN</th></tr>
<tr><td></td><td>Duct system leakage to outside:
For duct systems serving > 1,000ft^2 (92.9 m^2) of conditioned floor area, the duct leakage to outside rate shall be 4 cfm (113.3 L/min) per 100 ft^2 (9.29 m^2) of conditioned floor area.
For duct systems serving ≤ 1,000ft^2 (92.9 m^2) of conditioned floor area, the duct leakage to outside rate shall be 40 cfm (1132.7 L/min).</td><td>Duct System Leakage to Outside: The measured total duct system leakage rate shall be entered into the software as the duct system leakage to outside rate.
Exceptions:
<table><tr><td>1.</td><td>Where duct system leakage to outside is tested in accordance ANSI/ RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered.</td></tr><tr><td>2.</td><td>Where total duct system leakage is measured without the space conditioning equipment installed, the simulation value shall be 4 cfm (113.3 L/min) per 100 ft^2 (9.29 m^2) of conditioned floor area.</td></tr></table></td></tr>
<tr><td></td><td>Distribution System Efficiency (DSE): For hydronic systems and ductless systems a thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies.</td><td>Distribution System Efficiency (DSE): For hydronic systems and ductless systems, DSE shall be as specified in Table R405.4.2(2).</td></tr>
<tr><td>Thermostat</td><td>Type: Manual, cooling temperature setpoint = 75°F;
Heating temperature setpoint = 72°F.</td><td>Same as standard reference design.</td></tr>
<tr><td>Dehumidistat</td><td>Where a mechanical ventilation system with latent heat recovery is not specified in the proposed design: None. Where the proposed design utilizes a mechanical ventilation system with latent heat recovery:
Dehumidistat type: manual, setpoint = 60% relative humidity.
Dehumidifier: whole-dwelling with integrated energy factor = 1.77 liters/kWh.</td><td>Same as standard reference design.</td></tr>
</table>

For SI: 1 square foot = 0.93 m^2, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m^2, 1 gallon (US) = 3.785 L, °C = (°F-32)/1.8, 1 degree = 0.79 rad.

a.	Hourly calculations as specified in the ASHRAE *Handbook of Fundamentals,* or the equivalent, shall be used to determine the energy loads resulting from infiltration.
b.	The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals,* page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals,* page 26.19 for intermittent mechanical ventilation.
c.	Thermal storage element shall mean a component that is not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element shall be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or shall be connected to such a room with pipes or ducts that allow the element to be actively charged.
d.	For a *proposed design* with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.
e.	For a *proposed design* without a proposed heating system, a heating system having the prevailing federal minimum efficiency shall be assumed for both the *standard reference design* and *proposed design*.
f.	For a *proposed design* without a proposed cooling system, an electric air conditioner having the prevailing federal minimum efficiency shall be assumed for both the *standard reference design* and the *proposed design*.
g.	For a *proposed design* without a proposed water heater, the following assumptions shall be made for both the proposed design and *standard reference design*. <u>For a proposed design with a heat pump water heater, the following assumptions shall be made for the *standard reference design*, except the fuel type shall be electric.</u> Fuel Type: Same as the predominant heating fuel type Rated Storage Volume: 40 Gallons Draw Pattern: Medium Efficiency: Uniform Energy Factor complying with 10 CFR § <u>430.32</u>

h. For residences with conditioned basements, R-2 and R-4 residences, and for townhouse units, the following formula shall be used to determine glazing area:

AF	$= A_s \times FA \times F$
where:	
AF	= Total glazing area.
A_s	= *Standard reference design* total glazing area.
FA	= (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).
F	= (above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.
and where:	
-	Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.
-	Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.
-	Below-grade boundary wall is any thermal boundary wall in soil contact.
-	Common wall area is the area of walls shared with an adjoining dwelling unit.

<table>
<tr><td>i.</td><td>The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source of hot water and the fixtures that it serves (the “hot water rectangle”) divided by the floor area of the dwelling.

<table><tr><td>1.</td><td>Sources of hot water include water heaters, or in multiple-family buildings with central water heating systems, circulation loops or electric heat traced pipes.</td></tr><tr><td>2.</td><td>The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.</td></tr><tr><td>3.</td><td>The hot water rectangle shall be shown on the floor plans and the area shall be computed to the nearest square foot.</td></tr><tr><td>4.</td><td>Where there is more than one water heater and each water heater serves different plumbing fixtures and appliances, it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.</td></tr><tr><td>5.</td><td>The basement or attic shall be counted as a story when it contains the water heater.</td></tr><tr><td>6.</td><td>Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the area of the dwelling and identifying the appropriate compactness ratio and HWDS factor.</td></tr></table></td></tr>
<tr><td>j.</td><td>For a proposed design with electric resistance heating, a split system heat pump complying with 10 CFR §430.32 (2021) shall be assumed modeled in the standard reference design.</td></tr>
<tr><td>k.</td><td>For heating systems, cooling systems, or water heating systems not included in Table R405.4.2(1), the standard reference design shall be the same as proposed design.</td></tr>
<tr><td>l.</td><td>Only sections of ductwork that are installed in accordance with Items 1 or 2 of Section R403.3.4, are assumed to be located completely inside conditioned space. All other sections of ductwork are not assumed to be located completely inside conditioned space.</td></tr>
<tr><td>m.</td><td>Sections of ductwork installed in accordance with Section R403.3.5.1, are assumed to have an effective duct insulation R-value of R-25.</td></tr>
</table>

Reason:

It was discovered recently that the reference design requirement (added by a prior proposal action) to have the foundation wall or slab extension above grade set at 1 foot (while leaving the extension below grade “same as proposed”) can create some odd or wrong configurations of the reference design foundation. For example, consider an 8’ basement wall that is proposed to be 3 ft above grade and 5 ft below grade. The current reference design requirements would then result in a basement wall that is 1 foot above grade and only 5 ft below grade (for a total wall height of 6 ft). Attempting to fix this by setting a below grade depth for the reference design would then require different values to be established for basement walls vs. conditioned crawlspace walls in a somewhat arbitrary fashion without a clear basis to establish these geometry conditions for a standard reference design.

Given the above, it was decided the best way to fix this for the 2024 code would be to return to the language used in the 2021 code as

shown by the changes made in this proposal. Please note that while the term “slab” is used in describing the nature of foundation elements in the table, the term “slab-on-grade” is purposefully used when referencing the F-factors in Table R402.1.2. This is because F-factors are only applicable to slabs-on-grade, not slabs below grade (such as a conditioned basement slab or condition crawlspace ground area). In fact, the F-factors for slabs-on-grade are specifically based on a 6” slab edge extension above grade. Slabs that are some distance below grade are addressed in various rating and modeling software, but are not specifically addressed within the minimum criteria in Table R402.1.2. Consequently, if greater specificity in a standard reference design is to be addressed for a slab or foundation wall geometry relative to exterior grade, more work will be needed to properly coordinate this with the prescriptive requirements as well as how these foundation elements are modeled in various software.

Cost Impact:

The code change proposal will neither increase nor decrease the cost of construction.

The code change will neither increase nor decrease the cost of construction

The proposal corrects an error by restoring the reference design foundation wall description related to extension above or below grade to the approach currently in the 2021 IECC. Therefore, there is no cost increase or decrease. Although, this could have soft cost benefits by avoiding confusion in modeling and code compliance.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	REC2D-4-23 Table R405 edits
CDP ID #	
Code	IECC RE
Code Section(s)	R406.5 table
Location	
Proponent	Jay Crandell
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	As submitted. Corrects an error in the reference design oundation geometry condition and restores to the 2021 code language.
Vote	Approve 14-0
Recommendation Date	8/22/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-38-23 Roof reflectance
CDP ID #	1721
Code	IECC RE
Code Section(s)	R408.2.1.3
Location	
Proponent	Alisa McMahon mcmahon.gbac@cox.net
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	
Vote	As modified 14-0
Recommendation Date	8/22/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RE2D-38-23 Modification

IECC RE: Table R408.2, R408.2.1.3, Table R408.2.1.3, R408.2.1.3.1

Modification replaces the original proposal. Legislative edits are shown against Public Comment Draft #2.

Revise as follows:

TABLE R408.2

CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

		Climate Zone 0 & 1	Climate Zone 2
R408.2.1.3(1)	Roof solar reflectance index (roof is part of the *building thermal envelope* and directly above cooled, conditioned space)	1	~~1~~ 0
R408.2.1.3(2)	Roof solar reflectance index (roof is above an unconditioned space that contains a duct system)	1	1

R408.2.1.3 Roof solar reflectance index. ~~Roofs in Climate Zones 0-4 and 4C shall comply with one or more of the options in Table R408.2.1.3. The following roofs and portions of roofs are excluded from the roof reflectance credit:~~

Low slope roofs in *Climate Zones* 0-2 shall earn credit for Table R408.2 measure numbers R408.2.1.3(1) and R408.2.1.3(2) where the three-year aged solar reflectance index (SRI) is greater than or equal to 75. To earn credit, not less than 95 percent of the roof area shall comply. The combined area of the following portions of roof shall not be greater than 5 percent of the roof area:

1. Portions ~~of the roof~~ that include or are covered by the following:
    1.1 Photovoltaic systems or components.
    1.2 Solar air or water-heating systems or components.
    1.3 Vegetative roofs or landscaped roofs.

1.4 Above-roof decks or walkways.

1.5 Skylights.

1.6 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, or natural objects.

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.~~

The three-year aged SRI shall be determined in accordance with ASTM E1980 using a convection coefficient of 2.1 Btu/h x ft^2 x °F (12 W/m^2 x K). Calculation of aged SRI shall be based on three-year aged solar reflectance values tested in accordance with ASTM C1549, ASTM E903, ASTM E1918, or CRRC S100 and three-year aged thermal emittance values tested in accordance with ASTM C1371, ASTM E408, or CRRC S100.

~~**TABLE R408.2.1.3**~~

~~**MINIMUM ROOF REFLECTANCE**[a]~~

~~ROOF SLOPE~~	~~THREE-YEAR AGED SOLAR REFLECTANCE INDEX~~[b]
~~*Low slope*~~	~~75~~
~~*Steep slope*~~	~~16~~

~~a. The use of area-weighted averages to comply with these requirements shall be permitted.~~

~~Materials lacking 3-year-aged tested values for solar reflectance shall be assigned a 3-year aged solar reflectance in accordance with Section R408.2.1.3.1.~~

~~b. Solar reflectance index (SRI) shall be determined in accordance with ASTM E1980 using a convection coefficient of 2.1 Btu/h x ft^2 x °F (12 W/m^2 x K). Calculation of aged SRI shall be based on aged tested values of solar reflectance tested in accordance with ASTM C1549, ASTM E903, ASTM E1918, or CRRC S100 and thermal emittance tested in accordance with ASTM C1371, ASTM E408, or CRRC S100.~~

R408.2.1.3.1 Aged solar reflectance. Where ~~an~~ a tested 3-year aged solar reflectance value is not available, ~~it~~ an assigned value shall be determined in accordance with Equation 4-4.

$R_{aged} = [0.2 + 0.7(R_{initial} – 0.2)]$ (Equation 4-4)

where:

R_{aged} = The aged solar reflectance.

$R_{initial}$ = The initial solar reflectance determined in accordance with ASTM C1549, ASTM E903, ASTM E1918, or ~~with CRRC S100~~ CRRC S100.

Reason Statement

This Modification addresses the following shortcomings in Section R408.2.1.3:

1. **Section R408.2.1.3 does not explicitly state what percentage of roof area must comply with the SRI requirements to earn credit.**

   When this section was added in PCD #1, it was silent as to the percentage of roof area required for credit. Presumably, 100% was the default.

   In PCD #2, exception language was imported from Section C402.4 in the Commercial code. A percentage is buried in Exception 4. Per the proponent, the intention was not to provide a roof area compliance percentage, but rather to prevent false claiming of credit.

   Moreover, although the two sections have similarities, Section C402.4 is a *requirement*, while this section is an option.

   MODIFICATION:

   Explicitly states a required percentage and does so outside the exceptions.

2. **The required percentage of roof area must correlate with the credits in Table R408.2.**

Although Exception 4 was not intended to provide a compliance percentage, as PCD #2 reads, Exception 4 does exactly that.

What is that percentage? Exception 4 requires some work to decipher:

> In C402.4, where ≥75% of the roof area falls into one or more of the exceptions, the entire roof is exempt from the requirement. In other words, the requirement must be met if >25% of the roof area does not fall into one or more of the exceptions.
>
> But R408.2.1.3 is not a requirement; it's an optional measure. So, here, the exception language means: The roof can qualify for credit if >25% of the roof area does not fall into one or more of the exceptions.
>
> In other words, a roof qualifies for credit if 26% of the roof area meets the SRI and 74% does not.

In the context of this section, Exception 4 translates to: credit can be earned if just over 25% of roof area complies with the required SRI.

In PNNL's analysis, it was assumed **100%** of roof area met the required SRI. Modeled at 100% compliance, measure number R408.2.1.3(2) achieved one point by the slimmest of margins – 0.04% in Climate Zone 1 and 0.02% in Climate Zone 2. If PNNL had modeled, for example, 30% of roof area (or even a considerably higher percentage), the measure would not have met the 0.50 threshold to be rounded up to one point.

MODIFICATION:

To earn credit, 95% of roof area must meet the required SRI.

(Although 100% of roof area was modeled, a 5% allowance is provided for items such as HVAC equipment on the roof.)

3. The required SRIs must correlate with the credits in Table R408.2. The steep slope SRI does not.

In PCD #2, the required steep slope SRI is ≥16 and the required low slope SRI is ≥75.

PNNL modeled only SRI 75. The credit values in Table R408.2 are based solely on SRI 75.

Modeled at SRI 75, the measures barely achieved one point. Measure number R408.2.1.3(1) qualified for one point in one Climate Zone (rounded up from 0.67%) and measure number R408.2.1.3(2) qualified for one point in two Climate Zones (rounded up from 0.54% and 0.52%).

Modeled at SRI 16, neither measure would have qualified for a point in any Climate Zone.

MODIFICATION:

Deletes steep slope SRI 16. Credit can be earned only for low slope roofs with SRI ≥75.

4. This Modification also:

a. Adds (1) and (2) to the measure numbers in Table R408.2.

b. References the two measure numbers.

   In PCD #2, Section R408.2.1.3 does not reference the two measures in Table R408.2, only the two options in Table R408.2.1.3.

c. Replaces "reflectance" with "solar reflectance index" in the section title and measure descriptions.

   This change more accurately describes the measure and alleviates confusion between the terms "solar reflectance" (which is not included in the measure) and "solar reflectance index."

d. Removes Table R408.2.1.3. It is unnecessary; the measure reads clearer without it.

e. Adds "natural objects" to the list of items that can shade a roof, e.g., mountains, hills, bluffs.

   Reference: IECC-C Section C402.4.2 and IgCC Section 801.4.1.1

f. Removes credit for measure number R408.2.1.3(1) in Climate Zone 2 per PNNL's most recent analysis.

g. Replaces "Climate Zones 0-4 and 4C" with "Climate Zones 0-2" per PNNL analysis.

   The subcommittee has already approved this revision in RE2D-39.

This Modification brings Section R408.2.1.3 into alignment with the results of PNNL's analysis. Approval of this Modification would not require new analysis.

Cost Impact

The code change proposal will neither increase nor decrease the cost of construction. This is an optional measure that presumably will not be chosen unless it is cost effective.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RE2D-44-23 Energy efficient appliances edit
CDP ID #	1703
Code	IECC RE
Code Section(s)	R408.2.6
Location	
Proponent	Alex Smith asmith@npga.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	Sub-committee discussed the proponent's modification to the original proposal. Based on discussion, the SC supported the proponent's editorial improvements, but didn't agree to add the proposed language that would prevent compact appliances from qualifying for this credit in R408. The SC modified the proposal to remove that sentence and to also wordsmith the 1st sentence.
Vote	AS modified 9-0-5
Recommendation Date	8/22/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RE2D-44-23 Modification by Proponent was further modified in blue by SC to remove sentence on compact appliances and wordsmith 1st sentence

IECC RE: R408.2.6, TABLE R408.2.6

This Modification replaces the original proposal. The proposed changes, with one exception, are the same as in the original proposal; they are just moved around. Legislative edits are shown against Public Comment Draft #2. Additional information is provided in the Reason Statement.

Revise as follows:

R408.2.6 Energy efficient appliances. ~~All~~ ~~a~~Appliances of each of the types listed in Table R408.2.6 installed in a *residential building* shall comply with the efficiency requirements specified in ~~Table R408.2.6~~ that table. ~~Not less than three~~ Each appliance type~~s from~~ specified in Table R408.2.6 shall be installed. A clothes washer shall be installed at each location plumbed for a clothes washer. ~~Compact size appliances shall not be used to comply with this section.~~

Exception:

In *dwelling units* of Group R-2 occupancies, where a dishwasher is not installed in each ~~*dwelling unit*~~ unit, not less than two appliance types complying with Table R408.2.6 shall be installed. ~~In *common areas*, each appliance type shall comply with Table R408.2.6.~~

TABLE R408.2.6 MINIMUM EFFICIENCY REQUIREMENTS: APPLIANCES

APPLIANCE TYPES	EFFICIENCY IMPROVEMENT	TEST PROCEDURE
Refrigerator	Maximum Annual Energy Consumption (AEC)~~, No~~ no greater than 620 kWh/yr	10 CFR 430, Subpart B, Appendix A
Dishwasher	Maximum Annual Energy Consumption (AEC)~~, No~~ no greater than 240 kWh/yr	10 CFR 430, Subpart B, Appendix C1
Clothes washer	Clothes washer located within *dwelling units*: Maximum Annual Energy Consumption (AEC)~~, No~~ no greater than 130 kWh/yr,and Integrated Modified Energy Factor (IMEF) > 1.84 cu.ft/kWh/cycle Clothes washer not located within dwelling units and where *dwelling units* are not provided with ~~laundry facilities~~ rough-in plumbing for washers: Modified Energy Factor (MEF)>2.0 cu.ft/kWh/cycle	10 CFR 430 Subpart B, Appendix J2 and 10 CFR 430, Subpart B, Appendices D1 and D2

Reason Statement

A new version of R408.2.6 was approved in the last round. Like many new code sections, it has some loopholes and requires some clarification.

Compact Appliances

This is the annual energy use data for Energy Star Certified compact refrigerators and dishwashers:

Energy Star Certified Compact Appliances Annual Energy Use Ranges (kWh/yr)			
Energy Star Certified Appliance	U.S. Federal Standard	Energy Star	Energy Star Most Efficient
Compact Refrigerator	228 to 580	106 to 470	106 to 255
Compact Dishwasher	N/A	113 to 203	N/A

Source: www.energystar.gov/productfinder/product/certified-residential-refrigerators/results

R408.2.6 efficiency requirements are based on standard-size appliances. The annual energy use of compact appliances is generally, but not always, lower. R408 credit for compact appliances could be

justified only if R408.2.6 includes separate criteria for compacts that ensures the installation of *more efficient* compacts.

The table above does not include the annual energy use of compact appliances that are not Energy Star Certified. However, the U.S. Federal Standard range for Energy Star Certified compact refrigerators is informative. It tells us there are compact refrigerators on the market with an annual energy consumption of at least 580. There may be non-Energy Star compact refrigerators on the market with an even higher annual energy consumption. To put that in perspective, 580 is higher than the highest Energy Star Certified standard-size top freezer.

Compact appliances are not chosen to save energy. Rather, they are used when there is limited space and/or no need for standard-size appliances. Allowing compacts to qualify for R408 credit would not incentivize lower energy use. Rather, it would provide a) freebie credit for smaller appliances that will be used in those locations regardless and b) credit for high energy use compact models. For all these reasons, compacts should not qualify for R408 credit.

<u>All Appliances Must Comply To Earn Credit</u>

R408.2.6 does not explicitly require that all appliances in each type comply. Many larger homes have multiple appliances of one or more types. So, for example, a compact refrigerator in a wet bar can qualify a home for R408 credit even when the energy consumption of the standard-size refrigerator in the kitchen exceeds the maximum allowed!

Table R408.2 footnote "a" does not prevent this situation. In fact, as applied to this measure, the footnote clouds the situation. It requires a qualifying appliance to be installed in each location listed. However, the footnote does <u>not</u> require that <u>all</u> appliances in each location comply. So, for example, the footnote does not prevent the installation of just one qualifying washer in a common area laundry room with ten washers.

An early version of RED1-360 included a footnote that made clear that <u>all</u> washers in a common area must comply. That footnote has since been deleted.

Finally, other IECC-R sections employ "all" when needed to make the intent clear. The same is proposed here.

Prevent Future Installation of Less-Efficient Clothes Washers at Plumbed Locations

In some buildings, some (typically the larger) dwelling units are plumbed for washers and common area laundry facilities are provided. Footnote "a" to Table R408.2 provides that washers must be installed in both the plumbed dwelling units and the common area(s). But that should be stated explicitly in this section. The idea is to avoid future (e.g., post-COO) installation of less efficient appliances in plumbed dwelling units.

The loopholes described above are closed by the proposed changes.

Clothes Washers Located Outside Dwelling Units

The phrase "Where dwelling units are not provided with laundry facilities" in Table R408.2.6 is commonly interpreted as 'where dwelling units are not provided with a common area laundry room.' That is not what the proponents intended. The proposed change conveys the proponents' intent.

Reference: IRC definition of "rough-in."

Appliance Types

The term "appliance types" is used three times. Its meaning is clarified by changing the left column heading in Table R408.2.6 to "appliance types."

Not less than three

"Not less than three appliance types . . ." is a remnant from PCD#1 when the Table contained four appliance types. Since there are now only three, to avoid confusion, that phrase has been replaced by "Each appliance type . . ."

Other Appliance Types

As currently drafted in PCD#2, the first sentence could be construed to prohibit the installation of ovens, ranges and other appliance types not included in Table R408.2.6. That was not the proponents' intent.

Cost Impact

This code change proposal will neither increase or decrease the cost of construction. This is an optional measure that presumably will not be chosen unless it is cost effective.