International Energy Conservation Code
Consensus Committee-Residential

Draft Meeting Agenda (4/17/23 posting)

Webex Meeting Link

April 20, 2023
1:00 PM EST to 5 PM EST (4 hours)

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-April 13, 2023

6. Administrative issues-staff

7. Action Items-items in bold prioritized for PNNL analysis
Tabled items from 4/13

RED1-75-22(Credit for homeowner education)	**Modeling split 7-7**
RED1-263-22(Add. Efficiency credits for existing bldgs.)	**Existing bldg. approve 4-3**
RED1-250-22(Basement wall and slab on grade insulation)	Modeling disapproved 13-0-2
RED1-27-22(Glide path to zero net energy)	Modeling as modified 9-3-2
RED1-28-22(Operational carbon rating and energy)	Modeling as modified 7-4-2
RED1-266-22(Additions compliance)	Existing bldgs. Disapprove 6-1
RED1-273-22(Wall alt vapor retarders)	Existing bldgs. As modified 7-0
RED1-2-22(Approved Source)	Admin disapprove 5-0

RED1-16-22(Approved third-party inspection agencies)	Admin as modified 4-0
REPCD1-17-22	
RED1-21-22 PI & II(Renewable energy resources)	Admin disapprove 6-1
RED1-23-22(Renewables and biomass)	Admin disapprove 6-0

New proposals

RED1-259-22(Wall insulation edit)	Modeling disapprove 8-5-1
RED1-86-22(Electrification credit)	Modeling disapprove 8-5-1
RED1-261-22(Add general section)	Envelope approve 15-0
RED1-41-22(R405 multiplier public comment)	Envelope disapprove 11-4
IRCED1-8-22(Cool roof in Table N1108.2.1.3)	Envelope approve 15-0
RED1-254-22(Fenestration modifications)	Envelope as modified 15-0
RED1-84-22(R408 credits for fenestration improvements)	Envelope disapprove 14-0-1
RECD1-11-22(Floor insulation)	Envelope approve 13-0-1
REPCD1-18-22(Floor insulation question)-public comment no vote taken	
RED1-194-22(Air space R-value requirements)	Envelope as modified 14-0
RED1-230-22(Component floors)	Envelope as modified 9-4-1
RED1-218-22(Radiant barriers)	Envelope approve 14-0
RED1-30-22(Tighter envelope backstops)	Envelope disapprove 11-8
RED1-260-22(Editorial revision)	Envelope approve 14-0
REPCD-4-22(R408.2 table TBD)	
REPCD-5-22(Heat pump and TBD)	
REPCD-20-22(Efficient HVAC equipment comment)	
RED1-310-22(Demand recirc water system edit)	HVACR as modified 9-0
RECD1-1-22(Exhaust control)	HVACR approve 5-3-1
RED1-285-22(Duct system)	HVACR as modified 7-2
RED1-308-22(Max. total duct system leakage)	HVACR disapprove 9-0
RED1-307-22(Duct leakage table)	HVACR disapprove 7-0-2
RED1-305-22(Clarify duct location in ceiling)	HVACR disapprove 8-0
RED1-306-22(Ducts buried within ceiling insulation)	HVACR disapprove 8-0
RED1-302-22(Duct insulation exception)	HVACR approve 7-1-1
RED1-303-22(Duct insulation exception)	HVACR disapprove 8-0-1
RED1-359-22(More efficient duct system)	HVACR approve 10-0
RED1-342-22(Electric readiness space heating option)	HVACR disapprove 7-0-2
RED1-343-22(H/ERV option)	HVACR approve 7-0-2
RED1-352-22(Water heater efficiencies)	HVACR disapprove 8-0-1
RED1-77-22(R408 mech equipment edit)	HVACR disapprove 7-1-1
RED1-337-22(Air leakage and mech ventilation reorg)	HVACR approve 8-0

8. Other business.

9. Upcoming meetings. April 27 at 1 PM EST

10. Adjourn.

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

Join by phone

1-844-740-1264 USA Toll Free

+1-415-655-0003 US Toll

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

Kristopher Stenger, AIA, CBO

Director of Energy Programs
International Code Council
kstenger@iccsafe.org

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-075-22 Credit for homeowner education
CDP ID #	1354
Code	IECC RE
Code Section(s)	R408.2 Table
Location	base
Proponent	Amanda Hickman amanda@thehickmangroup.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	
Vote	vote to disapprove 7-7-0
Recommendation Date	4/11/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-75 Modification: NOT HEARD BY SUBCOMMITEE

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Revise all climate zones from ~~TBD~~ to 1

R408.2.10 Homeowner Education Program. The homebuilder shall provide the homeowners~~s~~ with educational information on the features of their newly constructed home and ways to save energy and reduce GHG emissions in accordance with an *approved* third-party program. The program shall include best practices for operating features of the home including but not limited to: proper maintenance of equipment, thermostat settings, lighting timers and use of high efficiency bulbs, water heater temperatures and settings, appliance use, pool and spa settings, regular HVAC filter changes, powering down electronics when not in use, interior shading of windows and doors.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-263-22
CDP ID #	1085
Code	IECC RE
Code Section(s)	New Definition, Table R408.2, New section R408.2.10, Revise sections R502.2.5 and R503.1.5
Location	base
Proponent	Sean Denniston, representing New Buildings Institute (sean@newbuildings.org)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
	Motion approval as submitted Reason: Proposal improves Code by including flexibility of the additional energy efficiency table.
Recommendation	Approval as submitted
Vote	4-3
Recommendation Date	4/5/2023
Next Step	To Subcommittee_____ To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	

Vote	Affirmative_____Negative_____Table_____ To Subcommittee_____

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-250-22 basement wall and slab on grade insulaiton
CDP ID #	1076
Code	IECC RE
Code Section(s)	R405.2 Table
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Disapprove Gayathri Vijayakumar; 2nd Jay Crandell
Recommendation	The sub-committee did not support striking the sections from the Table, but rather advised the proponent to modify the referenced sections instead
Vote	Disapprove 13/0/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-250-22 proposed modification: Not all modifications seen by subcommittee

R402.2.10 Slab-on-grade floors. Slab-on-grade floors, in contact with the ground, with a floor surface within 24 less than 12 inches (305 600 mm) above or below grade shall be insulated in accordance with one of the following~~Table R402.1.3~~.

Exception: Slab-edge insulation is not required in jurisdictions designated by the code official as having a very heavy termite infestation.

R402.2.10.1 Slab-on-grade floor insulation installation. For buildings complying with Section R401.2.1, ~~Where installed,~~ the slab edge continuous insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the vertical distance provided in **Table R402.1.3** but need not exceed the footing depth in accordance with Section R403.1.4 of the International Residential Code. ~~Alternatively, a proposed design for slab insulation R-value and installation shall comply with Table R402.1.2, Section R402.1.5, or Section R405.~~ Where a proposed design includes insulation extending away from the building, it shall be protected by pavement or by not less than 10 inches (254 mm) of soil. The top edge of the insulation installed between the *exterior wall* and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the *exterior wall*. ~~Where installed, full~~ Full slab insulation shall be continuous under the entire area of the slab-on-grade floor, except at structural column locations and service penetrations. Slab edge insulation required at the heated slab perimeter shall not be required to extend below the bottom of the heated slab and shall be continuous with the full slab insulation.

R402.2.10.2 Alternative slab-on-grade insulation configurations. For buildings complying with Sections R405 or R406, slab-on-grade insulation shall be installed in accordance with the *proposed design* or *rated design*. The proposed or rated design shall use an alternative insulation configuration and associated F-factor complying with Appendix A of ASHRAE 90.1 or, where adopted, Appendix RF of this code. Where used to comply with Section R401.2.1, the F-factor shall be equal to or less than the F-factor required by Table R402.1.2 for a heated or unheated slab, as applicable.

R402.2.11 Crawl space walls. Crawl space walls shall be insulated in accordance with one of the following~~Table R402.1.3~~.

Exception: Crawl space walls associated with a crawl space that is vented to the outdoors and the floor overhead is insulated in accordance with **Table R402.1.3** and **Section R402.2.8**.

R402.2.11.1 Crawl space wall insulation installations. Crawl space wall insulation shall comply with Table R402.1.3 and the following:

1. Where exterior crawl space wall insulation is installed, it shall be permanently attached to the wall and extend downward from the sill plate to not less than the base of the foundation wall.
2. Where interior crawl space wall insulation is installed, it shall be permanently attached to the foundation wall and extend downward from the sill plate at the top of the foundation wall to not less than the interior floor of the crawl space.

R402.2.11.2 Alternative crawl space wall insulation configurations. For buildings complying with Sections R405 or R406 crawl space wall insulation shall be installed in accordance with the *proposed design* or *rated design*. The proposed or rated design shall use an alternative insulation configuration and associated U-factor or C-factor complying with Appendix A of ASHRAE 90.1 or, where adopted, Appendix RF of this code. Where used to comply with Section R401.2.1, the U-factor or C-factor shall be equal to or less than the U-factor required by Table R402.1.2 for crawlspace walls.

Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the ***International Building Code*** or ***International Residential Code***, as applicable. Joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (153 mm) up stem walls and shall be attached to the stem walls.

TABLE R405.2
REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE

R402.2.10~~.1~~	Slab-on-grade floors ~~insulation installation~~
R402.2.11~~.1~~	Crawl space wall insulation ~~installation~~

TABLE R406.2
REQUIREMENTS FOR ENERGY RATING INDEX

R402.2.10~~.1~~	Slab-on-grade floors ~~insulation installation~~
R402.2.11~~.1~~	Crawl space wall insulation ~~installation~~

Cost Impact. This proposal will reduce the cost of construction by clarifying application of requirements for buildings complying with the Simulated Building Performance and Energy Rating Index paths.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-027-22 Glide path to zero net energy
CDP ID #	1119
Code	IECC RE
Code Section(s)	Appendix RG
Location	appendix
Proponent	Gayathri Vijayakumar gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve as shown on the screen Gayathri Vijayakumar; 2nd Shilpa Surana
Recommendation	The sub-committee supported a Glide Path Appendix as an optional pathway for AHJ's to adopt in order to achieve higher energy conservation without yet requiring net-zero performance or renewable installations. Compared to the version in the monograph, the Proponent had modified the ERI Max values to reflect 10% reduction below 2024 IECC ERI values without OPP and to revise the ERI Max values with OPP, based on recent PNNL analysis.
Vote	Approve 9/3/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-27-22 Approved as Modified in red

Note: yellow is unique text in this Appendix; other text was copied from Main body and will be revised to match Main body, if the copied text has been modified by other approved RED1s.

IECC: APPENDIX RG (New), RG101 (New), RG405.2 (New), RG406.5 (New), R406.5 (New), RG408.2 (New)

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com); Mark Lyles, representing California IOUs (markl@newbuildings.org)

2024 International Energy Conservation Code [RE Project]

Add new text as follows:

APPENDIX RG
2024 IECC Stretch Code
RG101
COMPLIANCE

RG405.2 Simulated Performance compliance. Compliance based on total building performance requires that a *proposed design* meets all of the following:

1. The requirements of the sections indicated within Table R405.2.

2. The proposed total *building thermal envelope* TC, which is the sum of the U-factor times assembly area and F-factor times perimeter, shall be less than or equal to the *building thermal envelope* TC using the prescriptive U-factors and F-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.10 in Climate Zones 3 through 8 in accordance with Equation 4-2. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

For Climate Zones 0-2: $TC_{Proposed\ design} \leq 1.08 \times TC_{Prescriptive\ reference\ design}$ (Equation 4-2)
For Climate Zones 3-8: $TC_{Proposed\ design} \leq 1.10 \times TC_{Prescriptive\ reference\ design}$

3. For buildings without a fuel burning appliance for space heating or water heating, the annual energy cost of the *proposed design* that is less than or equal to 75 percent of the annual energy cost of the *standard reference design*. For buildings with a fuel burning appliance for space heating or water heating, the annual energy cost of the *proposed design* that is less than or equal to 70 percent of the annual energy cost of the *standard reference design*. For dwelling units with greater than 5,000 square feet (465 m^2) of living space floor area located above grade plane, the annual energy cost of the *proposed design* shall be reduced by an additional 5 percent of 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.

Exceptions:

1.The energy use based on 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 multipliers for all energy sources shall be obtained from ASHRAE Standard 105 (Tables K2, K4, or K8) or from another data source approved by the code official.

2.The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost for an all-electric building with on-site renewable energy installed.

RG406.5 ERI-based compliance. Compliance based on an ERI analysis requires that the *rated proposed design* and confirmed built dwelling be shown to have an ERI less than or equal to the appropriate value indicated in Table R406.5 when compared to the *ERI reference design* as follows:

1.Where on-site renewables are not installed, the maximum ENERGY RATING INDEX NOT INCLUDING OPP applies.

2.Where on-site renewables are installed, the maximum ENERGY RATING INDEX INCLUDING OPP applies.

Exception: Where the ERI analysis excludes OPP, the maximum ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted.

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX NOT INCLUDING OPP	ENERGY RATING INDEX WITH OPP
0-1	~~45~~ 46	~~30~~ 27
2	~~45~~ 46	~~30~~ 26
3	45	~~30~~ 24
4	~~45~~ 48	~~30~~ 32
5	~~45~~ 49	~~30~~ 37
6	~~45~~ 48	~~30~~ 39
7	~~45~~ 47	~~30~~ 43
8	~~45~~ 47	~~30~~ 43

RG408.2 Additional energy efficiency credit requirements. No less than two measures shall be selected from Table R408.2 that meet or exceed a total of twenty credits. Five additional credits shall be selected for dwelling units with greater than 5,000 square feet (465 m^2) of living space floor area located above grade plane. Each measure selected shall meet the relevant subsections of Section R408 and receive credit as specified in Table R408.2 for the specific Climate Zone. For *dwelling units* in Group R-2 buildings, where applicable, the requirements shall be met in each dwelling unit in order to receive credit. Interpolation of credits between measures shall not be permitted.

Reason: This glide path appendix is being offered as a simple option for jurisdictions to adopt to exceed the energy performance 2024 IECC on their "glide path" to net zero energy. To attain that additional performance, this Appendix has three sections that would replace the corresponding sections in the main body of the code: one section from each Compliance option (Prescriptive, Simulated Performance, and ERI).
Where changes are made throughout the public comment period to these three copied sections, those changes would be intended to be updated here as well. Only highlighted text is intended to differ.

Bibliography:
None
Cost Impact:
The code change proposal will increase the cost of construction.
For jurisdictions that adopt this code, local building construction costs at the time of adoption should be considered to determine cost-effectiveness.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-028-22 Operational Carbon Rating and Energy Reporting
CDP ID #	1170
Code	IECC RE
Code Section(s)	Appendix RH
Location	appendix
Proponent	Gayathri Vijayakumar gayathri@swinter.com
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	Motion to Approve Gayathri Vijayakumar; 2nd Shilpa Surana
Recommendation	The sub-committee supported the Carbon Rating Appendix as an optional pathway for AHJ's to adopt in order to demonstrate reductions in operational carbon. Based on discussion, a motion to modify the max CO2e Index was made, increasing it to 65 from 55.
Vote	Approve 7/4/2
Recommendation Date	March 28, 2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-28-22 Approved as Modified in red by the Sub-Committee

Note: yellow is unique text in this Appendix; other text was copied from Main body and will be revised to match Main body, if the copied text has been modified by other approved RED1s.

IECC: APPENDIX RH (New), RH101 (New), SECTION 202 (New), RH102 (New), RH401.2 (New), RH401.3 (New), RH406.2 (New), RH406.7.2.2 (New)

Proponents: Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

2024 International Energy Conservation Code [RE Project]

Add new text as follows:

APPENDIX RH
Operational Carbon Rating and Energy Reporting

RH101
GENERAL DEFINITIONS

Add new definition as follows:

CO_{2e} INDEX. A numerical integer value, calculated in accordance with ANSI / RESNET / ICC 301 that represents the relative Carbon Dioxide equivalence (CO_2e) emissions of a *rated design* as compared with the CO_2e emissions of the CO_2e reference design and where an Index value of 100 represents the CO_2e performance of the CO_2e reference design and an Index value of 0 (zero) represents a home that emits zero net CO_2e annually.

Add new text as follows:

RH102
COMPLIANCE

RH401.2 Application. Residential buildings shall comply with Section R406.

Exception: Additions, alterations, repairs and changes of occupancy to existing buildings complying with Chapter 5.

RH401.3 Certificate. A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory *label*, service disconnect *label* or other required labels. The certificate shall indicate the following:

1. The predominant R-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls, crawl space walls* and floors and ducts outside *conditioned spaces*.

2. *U*-factors of fenestration and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for any component of the building envelope, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.

3. The results from any required duct system and building envelope air leakage testing performed on the building.

4. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.

5. Where on-site photovoltaic panel systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.

6. For buildings where an Energy Rating Index score is determined in accordance with Section R406, the Energy Rating Index score and CO2e Index, both with and without any on-site generation, shall be listed on the certificate.

7. The code edition under which the structure was permitted.

8. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

RH406.2 ERI and CO2e Index compliance. Compliance based on the ERI and *CO_{2e} Index* requires that the *rated design* and confirmed built dwelling meet all of the following:

1. The requirements of the sections indicated within Table R406.2.

2. Maximum ERI values indicated in Table R406.5.

3. Maximum *CO_2e Index* of ~~55~~ 65, not including OPP, determined in accordance with ANSI/RESNET/ICC 301.

RH406.7.2.2 Confirmed compliance report for a certificate of occupancy. A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

1. Building street address or other *building site* identification.

2. Declaration of ERI and *CO_2e Index* on title page and on building plans.

3. The name of the individual performing the analysis and generating the report.

4. The name and version of the compliance software tool.

5. Documentation of all inputs entered into the software used to produce the results for the reference design and the constructed dwelling unit.

6. A final confirmed certificate indicating that the constructed building has been verified to comply with Sections R406.2 and R406.4. The certificate shall report the energy features that were confirmed to be in the building, including: component-level insulation *R*-values or *U*-factors; results from any required duct system and building envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed. The certificate shall report the estimated *dwelling unit* energy use by fuel type, inclusive of all end-uses. Where on-site renewable energy systems have been installed on or in the building, the certificate shall report the type and production size of the installed system.

Reason:

As stated in the Executive Summary of the "Path Forward on Energy and Sustainability to Confront a Changing Climate," reduction of greenhouse gas emissions is part of our mission on this Committee. This proposal is a step toward that goal, by reporting an index, similar to ERI, that helps a builder/homeowner understand the performance of their home with respect to GHG. The calculation of this CO2e index has no added cost and requires no additional effort by the builder or rater. The same software that calculates an ERI in 2024 IECC R406 path will be done so in accordance with ANSI 301-2022. That Standard requires software to list this CO2e Index on labels & certificates. It will be published in time for reference within the 2024 IECC to include an update to GHG emission factors (Addendum B).

This proposal also provides an achievable but maximum CO2e Index and adds the reporting of energy use such that GHG emissions could be calculated separately, if other metrics are being used by the jurisdiction to document GHG performance.

Bibliography: None

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

The code change proposal will neither increase nor decrease the cost of construction since the reporting of this value is already part of compliance with the referenced Standard.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-266-22
CDP ID #	1003
Code	IECC RE
Code Section(s)	R502.1 Additions
Location	base
Proponent	Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
	Motion for Disapproval Reason: Language is not standard code language and terminology has discrepancies. Additions would need to be basically zero energy to comply in the performance option & that would like to see proposal come back in the next round.

Recommendation	Disapproval
Vote	6 in favor of disapproval. 1 against.
Recommendation Date	3/28/2023
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 #	RED1-273-22
CDP ID #	1360
Code	IECC RE
Code Section(s)	R503.1.1.3 Above-grade wall alterations.
Location	base
Proponent	Vladimir Kochkin, representing NAHB (vkochkin@nahb.org)
Proposal Status	SC rev
Subcommittee	RE Existing Bldg
Subcommittee Notes	Motion Approved as modified by the committee. See modification on sheet 3 Reason: Proposal provides flexibility for construction affecting existing structures – especially with regard to wall assemblies, exterior finishes, and not disturbing existing construction outside scope of work as well as providing for coordination with existing construction.

Recommendation	Approved as modified by the committee
Vote	7 votes in favor. 0 against.
Recommendation Date	3/28/2023
Next Step	To Subcommittee_____ To Advisory Group_____ To Consensus Committee_____X
Consensus Committee	

Committee Response	
Vote	Affirmative_____Negative_____Table_____ To Subcommittee_____
Date	

MOD for RED1-273-22

As modified in Sub Committee meeting 3/21/2023

R503.1.1.3 Above-grade wall alterations. Above-grade wall alterations shall comply with the following ~~requirements~~ as applicable:

1. Where interior finishes are removed ~~exposing~~ and wall cavities are exposed, the ~~existing~~ exposed cavities ~~cavity~~ shall be filled with existing or new insulation complying with Section R303.1.4 and an interior vapor retarder shall be provided where required in accordance with Section R702.7 of the *International Residential Code*.

2. Where exterior wall coverings and fenestration are removed and replaced for the full extent of any exterior wall assembly, 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.~~; **Exception:** where Class I vapor retarder is present in the existing wall assembly, the alteration shall be exempt from the~~ 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* and manufacturers' instructions.

~~3. Where Items 1 and 2 apply, the entire wall assembly shall be insulated in accordance with Section R402.1; and,~~

3~~4~~. 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 where required in accordance with Section R402.1 or an approved design that minimizes deviation from Section R402.1.

~~Where any of the above requirements are implemented applicable and resulted in a change of the vapor retarder classification, the above-grade wall alteration shall comply with the insulation and water vapor retarder requirements of Section R702.7 of the International Residential Code. Where the~~

~~exterior wall coverings are removed and replaced, the above-grade wall alteration shall comply with the water and wind resistance requirements of Section R703.1.1 of the International Residential Code.~~

~~**Exception:** Where the existing backing material does not meet the requirements of R703.1.2 for new construction, the alteration shall not reduce the water resistance and wind resistance of the wall assembly.~~

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-002-22 Approved source
CDP ID #	1106
Code	IECC RE
Code Section(s)	Chapter 2
Location	base
Proponent	Fredric Zwerg fredric.zwerg@swgas.com
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	Proposal does not address all of the places in the code where the term is used.
Recommendation	Disapproval
Vote	5-0-0
Recommendation Date	3.01.2023
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 #	RED1-016-22 Approved third-party inspection agencies
CDP ID #	1004
Code	IECC RE
Code Section(s)	R105.4
Location	base
Proponent	Robby Schwarz robby@btankinc.com
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	Proposal was tabled for several meetings to work on language. Proponent brought back proposal with amendments. Provides better guidance to utilize 3rd party inspection agencies to comply with the code. There were concerns raised by some in attendance that will likely address during the PC2 period.
Recommendation	Table until 3-1-2023 meeting From 3-1-2023 meeting: Table until 3.15.2023 meeting 3-15-2023: Approve as modified.
Vote	4-0-0
Recommendation Date	3-15-2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-16-22 – Modification

Proponents: Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)

2024 International Energy Conservation Code [RE Project]

Existing definition in the IECC – no modification

APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests furnishing inspection services, or furnishing product certification, where such agency has been *approved* by the *code official.*

Add Definition as Follows

Approved Third Party Inspection agency: A business, organization, or individual that is competent, independent and is used ~~when~~ where the *building official* requires the *owner* to employ a special inspector to develop *compliance documentation*, perform compliance testing, or inspect during construction, specific work as described in this code.

Add definition from IBC

OWNER. Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

SPECIAL INSPECTION. Inspection of construction requiring the expertise of an *approved special inspector, approved agency, or approved third party inspection agency* ~~in order~~ to ensure compliance with this code and the approved *construction and* compliance documents.

SPECIAL INSPECTOR. A qualified person employed or retained by an *approved* agency or approved third party inspection agency and *approved* ~~by the *building official*~~ as having the competence necessary to inspect a particular type of construction requiring *special inspection*.

SECTION R105 INSPECTIONS

R105.4 Approved third-party inspection agencies. The *code official* is authorized to accept reports of third-party inspection agencies ~~not affiliated with the *building* design or construction~~, provided that such agencies are *approved* as to qualifications and reliability relevant to the *building* components and systems that they are inspecting or testing, and ~~authorization~~ approval is given prior to issuance of the building permit.

R105.4.1 Authorization of approved third-party inspection agency. An *approved* third-party inspection agency shall provide all requested information ~~as necessary, upon request,~~ for the *code official* to determine that the agency meets the applicable requirements specified in Sections R105.4.1.1 through R105.4.1.3 and to authorize ~~their~~ its work in the jurisdiction.

R105.4.1.1 Independence. An *approved third-party inspection agency* shall be an objective, competent, and independent business identity. The agency shall perform ~~their~~ its duties ~~per~~ in accordance with the ~~express~~ guidance of the *code official*. The agency shall disclose to the *code official* any conflicts of interest including where fees for service are derived. The agency shall ~~explicitly understand that they are~~ acknowledge in writing that it is only able to work ~~within the jurisdiction giving approval if~~ where *approved* ~~approval is granted~~. ~~If~~ Where ~~approval is revoked the *code official* may reestablish approval at their discretion~~.

R105.4.1.2 Equipment. An *approved third-party inspection agency* shall have adequate equipment to perform inspections and tests required by the *code official* and this code. All testing equipment shall be periodically calibrated as required by the manufacturer, testing standards used in this code, or certifications held by the *approved agency*.

R105.4.1.3 Personnel. An *approved third-party inspection agency* shall ensure employed personnel are properly trained, and upon request, ~~be able to~~ provide written documentation to the *code official* demonstrating the competence and relevant experience or training of *special inspectors* who generate compliance documentation~~,~~ and perform the *special inspections~~,~~* and tests during construction.

R105.4.1.4 Authorization. ~~Upon approval of the *building official* the~~ Where approved, a third-party inspection agency shall have the authority to pass or fail delegated inspections and tests required by this code.

R105.4.2 Approved third-party inspections reporting. *Approved third-party inspection agencies* shall keep records of *special inspections,* tests, and compliance documentation required by this code ~~and created by the *approved third-party inspection agency or special inspector*~~. The *approved agency* shall submit reports of *special inspections* and tests to the *code official* and to the *owner* or owner's representative. Reports shall indicate that work inspected or tested was or was not completed in conformance to the *approved construction documents* ~~or the requirements of this code~~. A final report documenting required *special inspections* and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted, ~~along~~ with other required compliance documentation, at a ~~point in~~ time ~~agreed upon~~ required by the *code official* prior to the start of work by the *approved third-party inspection agency* ~~and the *building official*~~.

RED1-16-22 – Modification-FULL REPLACEMENT MODIFICATION NOT VOTED ON BY SUBCOMMITTEE

Proponents: Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)

2024 International Energy Conservation Code [RE Project]

This modification replaces RED1-16-22 in its entirety.

Add definition from IBC

OWNER. Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

SECTION R105 INSPECTIONS

R105.4 Approved third-party inspection agencies. The *code official* is authorized to accept reports of third-party inspection agencies, provided that such agencies are *approved* as to qualifications and reliability relevant to the *building* components and systems that they are inspecting or testing, and approval is granted prior to issuance of the building permit.

R105.4.1 Authorization of approved third-party inspection agency. An *approved* third-party inspection agency shall provide all requested information for the *code official* to determine that the agency meets the applicable requirements specified in Sections R105.4.1.1 through R105.4.1.3 and to authorize its work in the jurisdiction.

R105.4.1.1 Independence. An *approved* third-party inspection agency shall be an independent business identity. The agency shall perform its duties in accordance with the scope of delegated responsibilities established by the *code official*. The agency shall disclose to the *code official* any conflicts of interest including where fees for service are derived. The agency shall acknowledge in writing that it is only authorized to work within the scope of delegated responsibilities.

R105.4.1.2 Equipment. An *approved* third-party inspection agency shall have adequate equipment to perform inspections and tests required by the *code official* and this code. All testing equipment shall be periodically calibrated as required by the manufacturer, testing standards used in this code, or certifications held by the *approved* third-party inspection agency.

R105.4.1.3 Personnel. Personnel assigned by an *approved* third-party inspection agency to perform inspections and testing shall be trained or credentialed and documentation of training or credentials shall be available to *code official* upon request.

R105.4.1.4 Delegated Authority. Where *approved*, a third-party inspection agency shall have the authority to perform delegated inspections and determine compliance or noncompliance of work with *approved construction documents*.

R105.4.2 Approved third-party inspection agency reporting. An *approved* third-party inspection agency shall keep records of delegated inspections, tests, and compliance documentation required by this code. The agency shall submit reports of delegated inspections and tests to the *code official* and to the *owner* or *owner*'s representative. Reports shall indicate the compliance determination for the inspected or tested work based on *approved construction document*. A final report documenting required delegated inspections and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted, with other required compliance documentation, at a time required by the *code official*.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-021-22 PI Renewable energy resources
CDP ID #	1247
Code	IECC RE
Code Section(s)	R202
Location	base
Proponent	Tom Ortiz tortiz@npga.org
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	3/01/23 SC feels that RED1-21-22 P1, RED1-21-22 P2, RED1-22-22, RED1-23-22, and REPCD1-17-22 should be moved to a later meeting to be able to give the proponent and interested parties ample time to discuss the proposed changes 3/01/23 - SC Some liked where the proposal was going, but doesn't think it's ready yet. Code official needs more to enforce. Made motion to disapprove also based on consistent actions of commercial committee.
Recommendation	3/01/23 Table until 3.29.2023 meeting (unan 5-0-0) 3/29/23 Disapprove
Vote	6-1-0
Recommendation Date	3.29.2023
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 #	RED1-023-22 Renewables and biomass
CDP ID #	1071
Code	IECC RE
Code Section(s)	R202
Location	base
Proponent	Diana Burk diana@newbuildings.org
Proposal Status	SC rev
Subcommittee	RE Admin
Subcommittee Notes	03/01/23 SC feels that RED1-21-22 P1, RED1-21-22 P2, RED1-22-22, RED1-23-22, and REPCD1-17-22 should be moved to a later meeting to be able to give the proponent and interested parties ample time to discuss the proposed changes 03/29/23 Similar to commercial concerns that this proposal isn't ready yet and additional work needs to be done to properly track at the code official level.
Recommendation	03/01/23 Table until 3.29.2023 meeting 03/29/23 Disapproval
Vote	6-0-0
Recommendation Date	3.29.2023
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 #	RED1-086-22 Electrification credit
CDP ID #	1366
Code	IECC RE
Code Section(s)	R408.2.9
Location	base
Proponent	Amy Boyce amy.boyce@imt.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	approve fails 4-8-2. Disapproval then voted 8-5-1
Recommendation	Reason: The Sub-Committee discussed both 259 and 86 and took action on 86 prior to voting on 259. Based on the discussion and Disapproval of 86, RED1-259 was also Disapproved, thus keeping the Opaque Walls section within R408.
Vote	Disapproved 8-5-1
Recommendation Date	4/14/23
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 #	RED1-259-22 Wall insulation edit
CDP ID #	1233
Code	IECC RE
Code Section(s)	R408.2.9
Location	base
Proponent	Amy Boyce amy.boyce@imt.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	approve fails 5-8-1. Disapproval then voted 8-5-1
Recommendation	Reason: The Sub-Committee discussed both 259 and 86 and took action on 86 prior to voting on 259. Based on the discussion and Disapproval of 86, RED1-259 was also Disapproved, thus keeping the Opaque Walls section within R408.
Vote	Disapproved 8-5-1
Recommendation Date	4/14/23
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 #	RED1-261-22 Add general section
CDP ID #	1345
Code	IECC RE
Code Section(s)	RF101
Location	appendix
Proponent	Jay Crandell jcrandell@aresconsulting.biz
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Tabled to 4/5/23
Recommendation	This proposal adds a general section which is consistent with other appendices in the code.
Vote	15-0-0 for approval
Recommendation Date	4/5/23
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 #	RED1-041-22 R405 multiplier public comment
CDP ID #	1087
Code	IECC RE
Code Section(s)	R405.2
Location	base
Proponent	Ben Rabe ben@newbuildings.org
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	proponent recommends disapproval
Recommendation	Given the consensus around the omnibus and based on prior action on RED1-030, proponent recommends disapproval.
Vote	11-4-0 for disapproval
Recommendation Date	4/5/23
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 #	IRCED1-8-22 Cool roof in Table N1108.2.1.3
CDP ID #	953
Code	IRC
Code Section(s)	N1108.2.1.3 table
Location	base
Proponent	Aaron Phillips aphillips@asphaltroofing.org
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Unanimous vote for approval
Recommendation	This proposal updates and corrects references and footnotes.
Vote	15-0-0
Recommendation Date	4/5/23
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 #	RED1-254-22 Fenestration modifications
CDP ID #	1408
Code	IECC RE
Code Section(s)	R408.2
Location	base
Proponent	Craig Drumheller cdrumheller@wdma.com
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Unanimous vote for approval as modified
Recommendation	A number of changes are necessary in section R408 for fenestration in order to make the section more usable, improve the accuracy of credits allocated, and improve clarity and consistency. • Climate Zone 4 has been modified to exclude Zone 4 Marine and Zone 4C changed to 4 Marine in order to make it consistent with the prescriptive tables. • The 0.22 U-Factor measure has been removed. This is done because the associated points are only accurate with a 15% windows-to-floor area ratio that was used for the analysis. There are already multiple options to change the thermal performance of the building envelope which is a more accurate alternative that accounts for window area and better represents the savings associated with improving the building envelope. • Section R408.2.1.2 has been rewritten for clarity and to insure that window U-factor and SHGC weighted averages are permitted to achieve the Improved Fenestration target values. • Table R408.2.1.2 has been modified to include values for climate zones 4-6. It is believed that the overall energy savings is sufficient to earn 1 or 2 credits (needs to be verified by PNNL). • NAs have been changed to NRs to be consistent with the terminology in the prescriptive tables.
Vote	15-0-0 approve as modified
Recommendation Date	4/5/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	

Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

As Modified:

R408.2.1.2 Improved fenestration. The area weighted average U-factor and SHGC of all ~~the~~ vertical ~~Vertical~~ fenestration ~~shall meet one of the following: 1. U-factor equal to or less than 0.22 2. U-factor and SHGC~~ shall be equal to or less than ~~that~~ values specified in Table R408.2.1.2.

Modification not heard by subcommittee
RED1-254-22

IECC: TABLE R408.2, R408.2.1.2, TABLE R408.2.1.2

Proponents:
Craig Drumheller, representing Window & Door Manufacturers Association, (CDrumheller@wdma.com); Jennifer Hatfield, representing Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2024 International Energy Conservation Code [RE Project]

Revise as follows:

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Measure Number	Measure Description	Credit Value								
		Climate Zone 0 & 1	Climate Zone 2	Climate Zone 3	Climate Zone 4 except 4 Marine	Climate Zone 4~~C~~ Marine	Climate Zone 5	Climate Zone 6	Climate Zone 7	Climate Zone 8
R408.2.1.1(1)	≥2.5% Reduction in total UA	0	0	0	1	1	1	1	1	1
R408.2.1.1(2)	≥5% reduction in total UA	0	1	1	2	2	3	3	3	3
R408.2.1.1(3)	≥7.5% reduction in total UA	0	1	2	2	2	3	3	4	4
~~R408.2.1.2(1)~~	~~0.22 U-factor windows~~	~~1~~	~~2~~	~~2~~	~~3~~	~~3~~	~~4~~	~~4~~	~~4~~	~~5~~
R408.2.1.2(2)	U-factor and SHGC for ~~windows~~ vertical fenestration per Table R408.2.1	1	1	1	~~0~~ 2	~~0~~ 1	~~0~~ 1	~~0~~ 1	1	2
R408.2.1.3	Cool Roof	TBD	TBD	TBD	TBD	TBD	0	0	0	0
R408.2.2(1)	High performance cooling system option 1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(2)	High performance cooling system option 2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(3)	High performance gas furnace option 1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

R408.2.2(4)	High performance gas furnace option 2	0	0	0	0	0	TBD	TBD	TBD	0
R408.2.2(5)	High performance gas furnace and cooling system option 2	TBD	TBD	TBD	TBD	TBD	0	0	0	TBD
R408.2.2(6)	High performance gas furnace and heat pump system option 1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(7)	High performance gas furnace option 2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(8)	High performance heat pump system option 1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(9)	High performance heat pump system option 2	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(10)	High performance heat pump system option 3	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(11)	Ground source heat pump	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(12)	Ductless - Single zone	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(13)	Ductless - Multizone (Non-ducted indoor unit)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.2(14)	Ductless – Multizone (Ducted or Mixed)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

R408.2.3(1)	Gas-fired storage water heaters	7	6	5	3	3	2	2	3	1
R408.2.3(2)	Gas-fired instantaneous water heaters	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.3(3)	Electric water heaters	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.3(4)	Electric water heaters	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.3(5)	Solar hot water heating system	4	5	6	6	6	6	5	5	4
R408.2.3(6)	Compact hot water distribution	2	2	2	2	2	2	2	2	2
R408.2.4(1)	More efficient distribution system	4	6	7	10	10	12	13	15	16
R408.2.4(2)	100% of ducts in conditioned space	4	6	8	12	12	15	17	19	20
R408.2.4(3)	Reduced total duct leakage	1	1	1	1	1	1	2	2	2
R408.2.5(1)	2 ACH50 air leakage rate with ERV or HRV installed	1	4	5	10	10	13	15	8	8
R408.2.5(2)	2 ACH50 air leakage rate with balanced ventilation	2	3	2	4	4	5	6	6	6
R408.2.5(3)	1.5 ACH50 air leakage rated with ERV or HRV installed	2	4	6	12	12	15	18	11	11
R408.2.5(4)	1 ACH50 air leakage rate with ERV or HRV installed	2	5	6	14	14	17	21	14	14
R408.2.6	Energy efficient appliances	9	8	8	7	7	5	5	5	4
R408.2.7	Renewable energy measures	17	16	17	11	11	9	8	7	4

R408.2.9	Demand responsive thermostat	1	1	1	1	1	1	1	1	1

R408.2.1.2 Improved fenestration.

The area weighted average of the vertical ~~Vertical~~ fenestration ~~shall meet one of the following:~~

- 1.

~~U-factor equal to or less than 0.22~~

- .

2

U-factor and SHGC shall be equal to or less than ~~that~~ values specified in Table R408.2.1.2

TABLE R408.2.1.2 IMPROVED FENESTRATION

Climate Zone	Fenestration U-factor	Fenestration SHGC
0	0.32	0.23
1	0.32	0.23
2	0.30	0.23
3	0.25	0.25
4 except 4 Marine	~~NA~~ 0.25	~~NA~~ 0.40
5 and 4 Marine	~~NA~~ 0.25	~~NA~~ NR
6	~~NA~~ 0.25	~~NA~~ NR
7 and 8	0.25	~~NA~~ NR

Drumheller Modification- Further Modify Table R408.2.1.2

TABLE R408.2.1.2 IMPROVED VERTICAL FENESTRATION

Climate Zone	~~Fenestration~~ U-factor	~~Fenestration~~ SHGC
0	0.32	0.23
1	0.32	0.23
2	0.30	0.23
3	~~0.25~~ 0.28	~~0.25~~ 0.23
4 except 4 Marine	~~0.25~~ 0.27	0.40
5 and 4 Marine	0.25	NR
6	0.25	NR
7 and 8	0.25	NR

Reason:
A number of changes are necessary in section R408 for fenestration in order to make the section more usable, improve the accuracy of credits allocated, and improve clarity and consistency.

- Climate Zone 4 has been modified to exclude Zone 4 Marine and Zone 4C changed to 4 Marine on order to make it consistent with the prescriptive tables.
- The 0.22 U-Factor measure has been removed. This is done because the associated points are only accurate with a 15% windows to floor area ratio that was used for the analysis. There are already multiple options to change the thermal performance of the building envelope which is a more accurate alternative that accounts for window area and better represents the savings associated with improving the building envelope.
- Section R408.2.1.2 has been rewritten for clarity and to insure that window U-factor and SHGC weighted averages are permitted to achieve the Improved Fenestration target values.
- Table R408.2.1.2 has been modified to include values for climate zones 4-6. It is believed that the overall energy savings is sufficient to earn 1 or 2 credits (needs to be verified by PNNL).
- NAs have been changed to NRs to be consistent with the terminology in the prescriptive tables.

Cost Impact:

The code change proposal will neither increase nor decrease the cost of construction.
No change in cost.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-084-22 R408 credits for fenestration improvements
CDP ID #	1271
Code	IECC RE
Code Section(s)	R408.2.1.2
Location	base
Proponent	Amy Boyce amy.boyce@imt.org
Proposal Status	SC rev
Subcommittee	RE Econ, Model, Metric
Subcommittee Notes	
Recommendation	While some indicated that both proposals could be combined, preference was shown for the values in RED1-254.
Vote	14-0-1 for disapproval
Recommendation Date	4/5/23
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 #	RECD1-11-22 Floor insulation
CDP ID #	
Code	IECC RE
Code Section(s)	
Location	base
Proponent	Envelope and Embodied energy subcommittee
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	
Recommendation	
Vote	13-0-1 approval
Recommendation Date	4/5/23
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 #	RED1-194-22 Air space R-value requirements
CDP ID #	1135
Code	IECC RE
Code Section(s)	R303.1.5
Location	base
Proponent	Jay Crandell jcrandell@aresconsulting.biz
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Unanimous bot for approval as modified
Recommendation	Adds language to ensure air space R-values are properly specified and applied for both reflective and non-reflective air spaces.
Vote	14-0-0 approve as modified
Recommendation Date	4-5-23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-194-22 Modification

Proponent: Jay Crandell, ABTG/ARES, representing FSC

Revise proposal as follows (only highlighted changes):

Additional suggested edits added per feedback from RE Envelope subcommittee (Greg J.)

R303.1.5 Air spaces. Where the R-value of an enclosed reflective air space or enclosed non-reflective air space is used for compliance with this standard, the air space shall be enclosed in a~~n unventilated~~ cavity bounded on all sides by building components and constructed to minimize airflow into and out of the enclosed air space. Airflow shall be deemed minimized where one of the following conditions occur:

1. The enclosed air space is unventilated.

2. The enclosed air space is bounded on ~~at least~~ one or more side~~s~~ by an anchored masonry veneer, constructed in accordance with Chapter 7 of the International Residential Code, and vented by veneer weep holes located only at the bottom portion of the air space and spaced not less than 15 inches (381 mm) on center with the top of the cavity air space closed.

~~The R-value of an enclosed reflective air space shall be determined in accordance with Part 460 of US-FTC CFR Title 16 or ANSI/ASHRAE/IESNA 90.1, Appendix A, based on the building component containing the air space, air space thickness, effective emittance of the air space, and climate zone. Radiant barriers installed without facing an enclosed reflective air space shall not be counted as having an R-value. Enclosed non-reflective air spaces of minimum 1/2-inch (12.6 mm) thickness shall be assigned an R-value of R-0.9 or an R-value determined in accordance with ANSI/ASHRAE/IESNA 90.1, Appendix A, using an effective emittance of 0.82.~~

Exception: For ventilated cavities, the effect of the ventilation of air spaces located on the exterior side of the continuous air barrier and adjacent to and behind the exterior wall covering material shall be determined in accordance with ASTM C1363 modified with an airflow entering the bottom and

exiting the top of the air space at an air movement rate of not less than 70 mm/second.

(remainder of proposal unchanged)

REASON: This proposal was tabled until the RE-Envelope subcommittee's April 5th (final) meeting to allow time to respond to feedback and gain consensus from interested parties. The revisions as highlighted above are the result of discussions with interested parties to resolve concerns with the original RED1-194 proposal. Two revisions are made:

1) Delete "unventilated" from the charging language of R303.1.5 to align with changes made to the similar section in the commercial provisions.

2) Delete the 2nd paragraph in R303.1.5 which is not currently in the commercial provisions such that Section R303.1.5 aligns completely with the similar Section C402.2.7 of the commercial code.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-230-22 Component floors
CDP ID #	1010
Code	IECC RE
Code Section(s)	R402.5.1.1 table
Location	base
Proponent	Robby Schwarz robby@btankinc.com
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Approve as modified
Recommendation	Addressing previous comments made in RED1-18 and referring back to table we had approved in REDC1-11.
Vote	9-4-0 Approve as modified
Recommendation Date	3/8/23
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee_X_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-230-22 – **Modification**

Modification has been made in collaboration with the section R402.2.8 working group.

Table R402.4.1.1 Component Floors PC

IECC: TABLE R402.5.1.1 (New)

Proponents: Robert Schwarz, representing BUILDTank, Inc. (robby@buildtankinc.com)

2024 International Energy Conservation Code [RE Project]

Revise as follows:

TABLE R402.5.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a].

COMPONENT	AIR BARRIER AND AIR SEALING CRITERIA	INSULATION INSTALLATION CRITERIA
Floors, including cantilevered floors and floors above garages	~~The air barrier shall be installed , and air sealed to maintain its continuity at any exposed edges of insulation the insulated floor cavity.~~ ~~A *continuous air barrier* shall be installed at the *building thermal envelope* perimeter of the floor assembly.~~ Floor framing members that are part of the *building thermal envelope* shall be air sealed to maintain a *continuous air barrier*. Air permeable floor *cavity insulation* shall be enclosed ~~on six sides.~~	Floor ~~framing cavity~~ insulation shall be installed in accordance with the requirements of Section R402.2.~~7.~~8 ~~to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing; and shall extend from the bottom to the top of all perimeter floor framing members.~~

Reason: **Modification were made in conjunction with the working group that addressed the floor insulation section R402.2.8**
Table R402.5.1.1 has continued to evolve to recognize other component installation requirements that have been defined in Sections R402.2.1 through R402.2.13. Floor insulation installation requirements specifically, in Section R402.2. 8 of the 2024 IECC Public draft, have changed and the Component section of Floors in Table R402.5.1.1 has not changed in the same way causing inconsistency between the two sections of code.

Component Criteria: No Change proposed**.**

Air barrier and air sealing criteria section:

- Floor assemblies are not unlike vertical wall cavities laid down flat, therefore, air permeable insulation installed inside the cavity also needs to be enclosed by the air barrier assembly. As the IECC now allows three or more insulation techniques for insulating floors as seen in Section R402.2.8 it becomes more important to ensure that the rim joist or perimeter building thermal envelope of the insulated floor not only get insulated but is airtight because the insulation is no longer required to be installed adjacent to the subfloor decking. The proposed language brings this to light for builders and trades that are executing the code requirements.

Insulation Installation Criteria:

- The insulation installation criteria outlined in Section R402.2.8 clearly describes how insulation in floor systems must be installed. There is no need to further explain it in this table; the user is referred to Section R402.2.8.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
The proposed language does not increase the cost of construction but rather offers clarity of existing requirements for inspection and

installation of insulation.

International Energy Conservation Code

Code Change Proposal Tracking Sheet

Proposal #	RED1-218-22 Radiant barriers
CDP ID #	1091
Code	IECC RE
Code Section(s)	R402.3
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Unanimous approval
Recommendation	This is an editorial update to remove unnecessary language.
Vote	14-0-0 for approval
Recommendation Date	4-5-23
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 #	RED1-030-22 Tighter envelope backstops
CDP ID #	1347
Code	IECC RE
Code Section(s)	R102.1.1
Location	base
Proponent	Amy Boyce amy.boyce@imt.org
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	
Recommendation	
Vote	disapprove 11-8-0
Recommendation Date	3/8/23
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 #	RED1-260-22 Editorial revision
CDP ID #	1203
Code	IECC RE
Code Section(s)	R503.1.1
Location	base
Proponent	Hendrik Shank hendrikus.shank@dos.ny.gov
Proposal Status	SC rev
Subcommittee	RE Envelope
Subcommittee Notes	Unanimous approval
Recommendation	Editorial modification to italicize terms where the use is consistent with definitions..
Vote	14-0-0
Recommendation Date	3/22/23
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 #	RED1-310-22 Demand recirc water system edit
CDP ID #	1351
Code	IECC RE
Code Section(s)	R403.5.1.1.1
Location	base
Proponent	Alisa McMahon mcmahon.gbac@cox.net
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Presentation Alisa McMahon – Discussion started with a motion to approve "as modified" with an appropriate second. Questions and comments that came up during the discussion. 1. Question recommended distance language in R403.5.1.1 text in red. 2. Comment R403.5.1.1.1 strike out recommendation temperature. 3. R403.5.1.1.1.2 and 3 simplify language with recommendation adding friendly amendment to the "as modified"
Recommendation	Subcommittee having voted to approve "as modified" including friendly amendments. The recommendation from HVACR is to "approve as modified"
Vote	9/0/0
Recommendation Date	4/3/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee___x_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ Co-sponsor(s)

Date	

RED1-310-22

Proponents: Alisa McMahon, representing self (mcmahon.gbac@cox.net)

2024 International Energy Conservation Code [RE Project]

Revise as follows:

R403.5.1.1.1 Demand recirculation water systems. Where installed, *d emand recirculation water systems* shall have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance~~, sensing the presence of a user of a fixture~~ or sensing the flow of hot or tempered water to a fixture fitting or appliance.

Reason: Using a control that senses the presence of a user (i.e., an occupancy sensor) means that every time someone walks up to, or even past, a fixture – *for any reason* – the demand recirculation pump activates and may in turn activate the water heater.

There are many reasons to approach a bathroom or kitchen sink that do not involve the use of hot water. In fact, anecdotally, I kept track of my approaches and found I use hot water < 5% of the time, often using no water at all (e.g., comb hair, look in mirror, get something from cabinet under sink).

Push button control is preferred because it eliminates these "false signals" for pump operation that an occupancy sensor would generate. (California Energy Commission Building Energy Efficiency Standards Residential Compliance Manual)

"False signals" waste energy, both transporting unneeded hot water and when the draw triggers the water heater to fire up.

California Building Energy Efficiency Standards and California Green Building Standards Code specify the following recirculation system controls:

- manual activation with thermostat automatic shut off in one- and two-family dwellings
- controls that sense hot water demand and recirculation return temperatures for central recirculation systems that serve multiple dwelling units

Both of these controls remain represented in R403.5.1.1.1 after this proposed change.

The City of Scottsdale (Arizona) recently adopted the 2021 IECC with this proposed change as a local amendment.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
The code change proposal will neither increase nor decrease the cost of construction, but will decrease the cost of energy use.

Bibliography: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency-0
https://up.codes/viewer/california/ca-green-code-2019/chapter/A4/residential-voluntary-measures#A4.303.5
https://up.codes/viewer/california/ca-green-code-2019/chapter/2/definitions#demand_hot_water_recirculation_system

Attached Files

- **CA Codes re Demand Recirc Controls.pdf**
  https://energy.cdpaccess.com/proposal/1351/2828/files/download/468/

Workgroup Recommendation

Representatives from four companies that manufacture hot water circulation pumps with and without demand controls were invited to meet with the proponent to discuss the intent of the proposal and the concerns that the proposal was trying to address. After some very productive conversations everyone agreed that rather than removing one of the methods of activating a demand-controlled circulation pump, it was more important to include provisions in the section that discuss how the controls need to limit the run time of the pump.

Staff note: The changes recommended here also belong in the IRC energy chapter.

Revise as follows

R403.5.1.1 Circulation systems. Heated water circulation systems shall be provided with a circulation pump. Gravity and thermosyphon circulation systems shall be prohibited. ~~The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Gravity and thermosyphon circulation systems shall be prohibited.~~ Controls for circulating hot water system pumps shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Where a cold water supply pipe is used as the return pipe, a temperature sensor connected to the controls shall be located on the hot water supply no more than two feet from the connection to the cold water supply pipe. The controls shall limit the temperature of the water entering the cold water piping to not greater than 104°F (40°C).

R403.5.1.1.1 Demand recirculation water systems. ~~Where installed, d~~Demand recirculation water systems shall have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance, ~~sensing the presence of a user of a fixture~~ sensing the presence of a user of a fixture, or sensing the flow of hot or tempered water to a fixture fitting or appliance. The controls shall limit pump operation by:

1. Shutting off the pump when the temperature sensor detects one of the following:
    1.1. An increase in the water temperature of not more than 10°F (5.6°C) above the initial temperature of the water in the pipe.
    1.2. The temperature of the water in the pipe reaches 104°F (40°C).
2. Limiting pump operation to a maximum of five minutes following activation.
3. Not activating the pump for at least five minutes following shutoff or when the temperature of the water in the pipe exceeds 104°F (40°C).

Recommendation: Approve as modified

Reason: This section is missing one of the key elements for the energy efficiency of circulation loops: limiting the run time of the pump.

Green text is not new; it has been reordered for more logical flow.

Cost of construction: There is no increase in the cost of construction as the strategies for shutting off the pump are included in the manufacturer's controls.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RECD1-1-22 Intermittent exhaust control for bathroom and toilet rm
CDP ID #	
Code	
Code Section(s)	R403.6.4
Location	base
Proponent	HVACR subcommittee
Proposal Status	SC rev
Subcommittee	RE HVACR
Subcommittee Notes	Michael Fulton presenting. Motion to approve and a second opened the floor to discussion. A few questions regarding payback for this added cost to new construction. The proponent stated the payback is 1 – 4 years. A question was asked whether the ability can turn off the control. After discussion the subcommittee moved to a vote. With motion to approve the vote approved the proposal. Vote to approve carried.
Recommendation	HVACR recommendation is to approve as submitted.
Vote	Vote 5/3/1
Recommendation Date	4/3/2023
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 #	RED1-285-22 Duct system
CDP ID #	1060
Code	IECC RE
Code Section(s)	R401.3
Location	base
Proponent	Gary Klein iecc-pipe-insulation@2050partners.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Ducts working group Chair (HVACR) Gary Klein opened the discussion with a recommendation from the working group to approve as modified. Gayathri Vijayakumar presented the proposal with the most recent Modification. This is a very detailed proposal with many Proposals folded into this proposal. Many members of the HVACR subcommittee and interested participated in the working Group discussions and input into this proposal. Vote on the proposal "as modified" carried with strong support. 7/2/0 - Gayathri Vijayakumar presented an addition a change incorporated into 285 which is RED1-285-22 with R408. Vote to approve as amended carried 7/1/1
Recommendation	Recommendation from the subcommittee voting is to approve "as modified"
Vote	7/2/0
Recommendation Date	4/3/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee__x _____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee

Date	

RED1-285-22 – AS MODIFIED IN RED BY DUCT WORKING GROUP AND HVACR-WH SUBCOMMITTEE

IECC: SECTION 202 (New), SECTION 202, R401.3, R402.2.9, TABLE R402.5.1.1, SECTION R403, R403.3, R403.3.1, R403.3.2, R403.3.3, R403.3.3.1, R403.3.4, R403.3.4.1, R403.3.5, R403.3.6, TABLE R403.3.6, R403.3.7, R403.3.8, TABLE R403.6.2, SECTION R405, R405.3.2.1, TABLE R405.4.2(1), TABLE R405.4.2(2), SECTION R408, TABLE R408.2, R408.2.4, SECTION R502, R502.2.2, SECTION R503, R503.1.2, R503.1.2.1, R503.1.2.3

Proponents: Gary Klein, representing Self (gary@garykleinassociates.com); Mark Lyles, representing California IOUs (markl@newbuildings.org); Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

2024 International Energy Conservation Code [RE Project]

Add new definition as follows:

AIR-HANDLING UNIT. A blower or fan used for the purpose of distributing supply air to a room, space or area.

Revise as follows:

CONDITIONED SPACE. An area, room or space that is enclosed within the *building thermal envelope* and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ~~ducts~~ *ducts*, piping or other sources of heating or cooling.

Add new definition as follows:

DAMPER. A manually or automatically controlled device to regulate draft or the rate of flow of air or combustion gases.

Revise as follows:

DUCT SYSTEM. ~~A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances~~ A system that consists of *space conditioning equipment*, *ductwork*, and shall include any apparatus installed in connection therewith.

Add new definition as follows:

DUCTWORK. The assemblies of connected *ducts*, *plenums*, boots, fittings, *dampers*, supply registers, return grilles, and filter grilles through which air is supplied to or returned from the space to be heated or cooled. Supply ductwork delivers air to the spaces from the *space conditioning equipment*. Return ductwork conveys air from the spaces back to the *space conditioning equipment*.

HEAT EXCHANGER. A device that transfers heat from one medium to another.

OCCUPIABLE SPACE. An enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only intended to be occupied occasionally and for short periods of time.

PLENUM. An enclosed portion of the building structure, other than an *occupiable space* being conditioned, that is designed to allow air movement, and thereby serve as part of the supply or return *ductwork*.

SPACE CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

SPACE CONDITIONING EQUIPMENT. The *heat exchangers*, *air-handling units*, filter boxes, and any apparatus installed in connection therewith used to provide *space conditioning*.

Revise as follows:

R401.3 Certificate. A permanent certificate shall be completed by the builder or other approved party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or

obstruct the visibility of the circuit directory *label*, service disconnect *label* or other required labels. The certificate shall indicate the following:

1. **The predominant *R*-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, *crawl space walls* and floors and *ducts* ~~ducts~~ outside *conditioned spaces*.**
2. ***U*-factors of fenestration and the *solar heat gain coefficient* (SHGC) of fenestration. Where there is more than one value for any component of the building envelope, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.**
3. **The results from any required *duct system* ~~duct system~~ and building envelope air leakage testing performed on the building.**

4. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.
5. Where on-site *photovoltaic panel* systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.
6. For buildings where an Energy Rating Index score is determined in accordance with Section R406, the Energy Rating Index score, both with and without any on-site generation, shall be listed on the certificate.
7. The code edition under which the structure was permitted, the compliance path used, and where applicable, the additional efficiency measures selected for compliance with R408.
8. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

R402.2.9 Basement walls. Basement walls shall be insulated in accordance with Table R402.1.3. Exception: Basement walls associated with unconditioned basements where all of the following requirements are met:

1. The floor overhead, including the underside stairway stringer leading to the basement, is insulated in accordance with Section R402.1.3 and applicable provisions of Sections R402.2 and R402.2.8.
2. There are no uninsulated ~~duct~~ *ductwork*, domestic hot water piping, or hydronic heating surfaces exposed to the basement.
3. There are no HVAC supply or return diffusers serving the basement.
4. The walls surrounding the stairway and adjacent to *conditioned space* are insulated in accordance with Section R402.1.3 and applicable provisions of Section R402.2.
5. The door(s) leading to the basement from *conditioned spaces* are insulated in accordance with Section R402.1.3 and applicable provisions of Section R402.2, and weatherstripped in accordance with Section R402.5.
6. The building thermal envelope separating the basement from adjacent *conditioned spaces* complies with Section R402.5.

TABLE R402.5.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

Portions of table not shown remain unchanged.

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Shafts, penetrations	*Duct* ~~Duct~~ and flue shafts to exterior or unconditioned space shall be sealed. Utility penetrations of the air barrier shall be caulked, gasketed or otherwise sealed and shall allow for expansion, contraction of materials and mechanical vibration.	Insulation shall be fitted tightly around utilities passing through shafts and penetrations in the building thermal envelope to maintain required *R*-value.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air sealed in accordance with Section R402.5.5.	Recessed light fixtures installed in the building thermal envelope shall be airtight and IC rated, and shall be buried in or surrounded with insulation.
Electrical,communication, and other equipment boxes, housings, and enclosures	Boxes, housing, and enclosures that penetrate the air barrier shall be caulked, taped, gasketed, or otherwise sealed to the air barrier element being penetrated. All concealed openings into the box, housing, or enclosure shall be sealed. The continuity of the air barrier shall be maintained around boxes, housings, and enclosures that penetrate the air barrier. Alternatively, air-sealed boxes shall be installed in accordance with R402.5.6.	Boxes, housing, and enclosures shall be ~~burried~~ buried in or surrounded by insulation.
HVAC register boots	HVAC supply and return register boots ~~that penetrate building thermal envelope~~ shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.	HVAC supply and return register boots located ~~in~~ within a ~~the building's thermal envelope~~ *building thermal envelope* assembly shall be buried ~~burried~~ in or ~~and~~ surrounded by insulation.

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

b. Insulation full enclosure is not required in unconditioned/ventilated attic spaces and at rim joists.

SECTION R403 SYSTEMS

Revise as follows:

R403.3 Duct systems. ~~Ducts and air handlers~~ *Duct systems* shall be installed in accordance with Sections R403.3.1 through R403.3.~~8~~7~~9~~.
Exception: *Ducts* serving ventilation systems that are not integrated with *duct systems* serving heating or cooling systems.

R403.3.1 ~~Ducts~~ Ductwork located outside conditioned space. Supply and return *ductwork* ~~*ducts*~~ located outside *conditioned space* shall be insulated to an *R*-value of not less than R-8 for *ducts* 3 inches (76 mm) in diameter and larger and not less than R-6 for *ducts* smaller than 3 inches (76 mm) in diameter. *Ductwork* ~~*Ducts*~~ buried beneath a building shall be insulated as required per this section or have an equivalent *thermal distribution efficiency*. Underground *ductwork* ~~*ducts*~~ utilizing the *thermal distribution efficiency* method shall be listed and *labeled* to indicate the *R*-value equivalency.

R403.3.2 Duct~~s~~ systems located in conditioned space. For ~~ductwork~~ *duct systems* to be considered inside a *conditioned space,* the *space conditioning equipment* shall be located completely within the *continuous air barrier* and ~~within~~ the *building thermal envelope.* The *ductwork* ~~it~~ shall comply with ~~one of~~ the following:

1. The ~~duct system~~ *ductwork* shall be located completely within the *continuous air barrier* and ~~within~~ the building thermal envelope.

2. *Ductwork* ~~Ductwork~~in ventilated attic spaces or unvented attics with vapor diffusion ports shall be buried within ceiling insulation in accordance with Section R403.3.3 and ~~all of~~ shall comply with the following ~~conditions shall exist~~:

   2.1. ~~The air handler is located completely within the *continuous air barrier* and within the *building thermal envelope*.~~

   2.2 1. The ~~duct~~ *ductwork* leakage, as measured either by a rough-in test of the supply and return ~~ducts~~ *ductwork* or a post-construction ~~total~~ *duct system* leakage test to outside the *building thermal envelope* in accordance with Section R403.3. 5~~6~~, ~~is less than or equal to~~ is not greater than 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area* served by the *duct system*.

   2.3 2. The ceiling insulation *R*-value installed against and above the insulated ~~duct~~ *ductwork* is greater than or equal to the proposed ceiling insulation *R*-value, less the *R*-value of the insulation on the ~~duct~~ *ductwork*.

3. *Ductwork* ~~located in~~ contained within wall or floor building assemblies separating unconditioned from conditioned space shall comply with the following:

   3.1. A *continuous air barrier* shall be installed as part of the building assembly between the ~~duct~~ *ductwork* and the unconditioned space.

   3.2. ~~Ducts~~ *Ductwork* shall be installed in accordance with Section R403.3.1.

   Exception: Where the building assembly cavities containing ~~ducts~~ *ductwork* have been air sealed in accordance with Section R402.5.1, duct insulation is not required.

   3.3. Not less than R-10 assembly insulation, ~~and~~ or not less than 50 percent of the required R-value specified in Table R402.1.3, whichever is greater, shall be located between the ~~duct~~ *ductwork* and the unconditioned space.

   ~~3.4 For ducts in these building assemblies to be considered within conditioned space, the air handling equipment shall be installed within conditioned space.~~ Segments of ductwork contained within these building assemblies shall not be considered completely inside *conditioned space* in Sections R405 or R406.

R403.3.3 Ductwork ~~Ducts~~ buried within ceiling insulation. Where supply and return *ductwork* ~~air ducts~~ are partially or completely buried in ceiling insulation, such *ductwork* ~~ducts~~ shall comply with ~~all of~~ the following:

1. The supply and return ~~ducts~~ *ductwork* shall be insulated with ~~have an insulation *R*-value~~ not less than R-8 insulation.
2. At all points along ~~each duct~~ the *ductwork*, the sum of the ceiling insulation *R*-value against and above the top of the ~~duct~~ *ductwork*, and against and below the bottom of the ~~duct~~ *ductwork*, shall be not less than R-19, excluding the *R*-value of the duct insulation.
3. In Climate Zones 0A, 1A, 2A and 3A, the supply ~~ducts~~ *ductwork* shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-13 and in compliance with the vapor retarder requirements of Section 604.11 of the International Mechanical Code or Section M1601.4.6 of the International Residential Code, as applicable.

   Exception: Sections of the supply ~~ducts~~ *ductwork* that are less than 3 feet (914 mm) from the supply outlet ~~shall not be required to comply with these requirements~~.

4. In Climate Zones 0A, 1A, 2A and 3A ~~when~~ where installed in an unvented attic with vapor diffusion ports, the supply ~~ducts~~ *ductwork* shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-8 and in compliance with the vapor retarder requirements of Section 604.11 of the *International Mechanical Code* or Section M1601.4.6 of the *International Residential Code*, as applicable.

   Exception: Sections of the supply ~~ducts~~ *ductwork* duct that are less than 3 feet (914 mm) from the supply outlet ~~shall not be required to comply with these requirements~~.

4.1 Air permeable insulation installed in unvented attics shall ~~be in compliance~~ comply with ~~the requirements of~~ Section R806.5.5.2 of the *International Residential Code*.

R403.3.3.1 Effective R-value of deeply buried ducts. Where using the Building Simulated Performance Compliance Option in accordance with Section R401.2.2, sections of ~~ducts~~ *ductwork* that are installed in accordance with Section R403.3.3 surrounded with blown-in attic insulation having an *R*-value of R-30 or greater and located such that the top of the ~~duct~~ *ductwork* is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation *R*-value of R-25.

R403.3.4 Sealing. ~~Ducts, air handlers~~ *Ductwork*, *air-handling units* and filter boxes shall be sealed. Joints and seams shall comply with either the International Mechanical Code or International Residential Code, as applicable.

R403.3.4.1 Sealed ~~air handler~~ air-handling unit. ~~Air handlers~~*Air-handling units* shall have a manufacturer's designation for an air leakage of not greater than 2 percent of the design airflow rate when tested in accordance with ASHRAE 193.

R403.3.5 Duct system testing. Each *duct system* ~~ducts system~~ shall be tested for air leakage in accordance with ANSI/RESNET/ICC 380 or ASTM E1554. Total leakage shall be measured with a pressure differential of 0.1 inch water gauge ~~w.g.~~(25 Pa) across the ~~system~~ *duct system* and

shall include the measured leakage from both the supply and return *ductwork*. ~~Registers shall be sealed during the test.~~ A written report of the test results shall be signed by the party conducting the test and provided to the *code official*. *Duct system* ~~Duct system~~ leakage testing at either rough-in or post-construction shall be permitted with or without the installation of registers or grilles. Where installed, registers and grilles shall be temporarily sealed during the test. Where not installed, the face of the register boots shall be temporarily sealed.

Exceptions:

1. Testing shall not be required for *duct systems* ~~duct systems~~ serving ventilation systems that are not integrated with *duct systems* ~~duct systems~~ serving heating or cooling systems.
2. Testing shall not be required where there is not more than 10 feet of total *ductwork* external to the *space conditioning equipment* and both the following are met :
   a. The *duct system* is located entirely within *conditioned space* .
   b. The *ductwork* does not include *plenums* constructed of building cavities or sheetrock.
3. W here the *space conditioning equipment* is not installed , testing shall be permitted. The total measured leakage of the supply and return *ductwork* shall be less than or equal to 3.0 cubic f eet per minute (85 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area.* –

~~2~~ 4. Where tested in accordance with Section R403.3.7, testing of each *duct system* ~~duct system~~ is not required.

R403.3.6 Duct system leakage. The total measured ~~duct system~~ *duct system* leakage shall not be greater than the values in Table R403.3.6, based on the conditioned floor area, number of ducted returns, and location of the *duct system.* For buildings complying with Section R405 or R406, where ~~duct system~~ *duct system* duct system leakage to outside is tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554, the leakage to outside value shall not be used for compliance with this section, but shall be permitted to be used in the calculation procedures of Section R405 and R406.

TABLE R403.3.6 MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

~~ROUGH IN~~	~~POST CONSTRUCTION~~	
~~Duct systems serving more than 1,000 ft² of conditioned floor area~~	~~cfm/100 ft² (LPM/9.29 m²)~~	~~cfm/100 ft² (LPM/9.29 m²)~~
~~Air handler is not installed~~	~~3 (85)~~	~~NA~~
~~Air handler is installed~~	~~4 (113.3)~~	~~4 (113.3)~~
~~Duct systems located in conditioned space, with air handler installed~~	~~8 (226.6)~~	~~8 (226.6)~~
~~Duct systems serving less than or equal to 1,000 ft² of conditioned floor area~~	~~cfm (LPM)~~	~~cfm (LPM)~~
~~Air handler is not installed~~	~~30 (849.5)~~	~~NA~~
~~Air handler is installed~~	~~40 (1132.7)~~	~~40 (1132.7)~~
~~Duct systems located in conditioned space, with air handler installed~~	~~80 (2265.4)~~	~~80 (2265.4)~~

	Duct systems serving more than 1,000 ft² of conditioned floor area		*Duct systems* serving ~~less than or equal to~~ 1,000 ft² ~~or less~~ of conditioned floor area
	cfm/100 ft² (LPM/9.29 m²)		cfm (LPM)
	Number of ducted returns [a]		
	< 3	≥ 3	Any
Space conditioning equipment is not installed [b, c]	3 (85)	4 (113~~.3~~)	30 (~~850~~ ~~849.5~~)
All components of the *duct system* are installed	4 (113~~.3~~)	6 (170)	40 (113~~32.7~~)
Space conditioning equipment is not installed, but the *ductwork* is located entirely in *conditioned space* [cd]	6 (170)	8(227)	60 (1699)
All components of the *duct system* are installed and entirely located in *conditioned space* [c]	8 (22~~76.6~~)	12(340)	80 (2265~~.4~~)

a. A ducted return is a *duct* made of sheet metal or flexible *duct* that connects one or more return grilles to the return-side inlet of the *air-handling unit*. Any other approach to convey air from return or transfer grille(s) to the *air-handling unit* does not constitute a ducted return for the purpose of determining maximum total *duct system* leakage allowance.

b. Where the *space conditioning equipment* is not installed, *duct system* testing shall be permitted and shall include the measured leakage from both the supply and return *ductwork*. *Duct system* testing shall not be performed if the return *ductwork* is not installed.

c. For *duct systems* to be considered inside a *conditioned space*, where the *ductwork* is located in ventilated attic spaces or unvented attics with vapor diffusion ports, *duct system* leakage to outside shall comply with Item 2.1 of Section R403.3.2. ~~be measured in accordance with ANSI/RESNET/ICC 380 or ASTM E1554 and shall be less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of *conditioned floor area* served by the *duct system*.~~

d. Prior to certificate of occupancy, where the *air-handling unit* is verified as being located in unconditioned space, the total *duct system* leakage must be re-tested.

R403.3.7 Dwelling unit sampling. For buildings with eight or more *dwelling units* the duct systems in the greater of seven, or 20 percent of the *dwelling units* in the building shall be tested, including a top floor unit, a ground floor unit, a middle floor unit, and the unit with the largest conditioned floor area. Where buildings have fewer than eight *dwelling units*, the duct systems in each unit shall be tested. Where the leakage ~~rate~~ of a *duct system* is greater than the maximum permitted *duct system* leakage ~~rate~~, corrective actions shall be made to the *duct system* ~~system~~ and the *duct system* shall be retested until it passes. For each tested *dwelling unit* that has a greater total *duct system* leakage ~~rate~~ than the maximum permitted *duct system* leakage ~~rate~~, an additional three *dwelling units*, including the corrected unit, shall be tested.

R403.3.~~8~~2 Building cavities. *Building* framing cavities shall not be used as ~~ducts~~ *ductwork* or *plenums*.

R403.3.1 Duct System Design. *Duct systems* serving one or two *dwelling units* shall be designed and sized in accordance with ANSI/ACCA Manual D. *Duct systems* serving more than two *dwelling units* shall be sized in accordance with the ASHRAE Handbook of Fundamentals, ANSI/ACCA Manual D, or other equivalent computation procedure.

TABLE R403.6.2 WHOLE-DWELLING MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]

Portions of table not shown remain unchanged.

SYSTEM TYPE	AIRFLOW RATE (CFM)	MINIMUM EFFICACY (CFM/WATT)	TEST PROCEDURE
~~Air handler~~ *Air-handling unit* that is integrated to tested and *listed* HVAC equipment	Any	1.2	Outdoor airflow as specified. *Air-handling unit* ~~Air handler~~ fan power determined in accordance with the HVAC appliance's test method referenced by Section C403.3.2 of the IECC-Commercial Provisions.

For SI: 1 cubic foot per minute = 0.47 L/s.

a. **Design outdoor airflow rate/watts of fan used.**

SECTION R405 SIMULATED BUILDING PERFORMANCE

Revise as follows:

R405.3.2.1 Compliance report for permit application. A compliance report submitted with the application for building permit shall include the following:

1. **Building street address, or other *building site* identification.**
2. **The name of the individual performing the analysis and generating the compliance report.**
3. **The name and version of the compliance software tool.**
4. **Documentation of all inputs entered into the software used to produce the results for the reference design and/or the rated home.**
5. **A certificate indicating that the proposed design complies with Section R405.3. The certificate shall document the building components' energy specifications that are included in the calculation including: component-level insulation *R*-values or *U*-factors; ~~duct system~~ *duct system* and building envelope air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.**
6. **Where a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated home.**

TABLE R405.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

Portions of table not shown remain unchanged.

<table>
<tr><th>BUILDING COMPONENT</th><th>STANDARD REFERENCE DESIGN</th><th>PROPOSED DESIGN</th></tr>
<tr><td></td><td>Duct location</td><td>Duct location: as proposed</td></tr>
<tr><td></td><td>
<table>
<tr><th>Foundation type</th><th>Slab on grade</th><th>Unconditioned crawl space</th><th>Basement or conditioned crawl space</th></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 crawl space

All other: 75% in unconditioned crawlspace and 25% inside conditioned space</td><td>~~75~~50% inside conditioned space

~~25~~50% unconditioned attic</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>Duct Insulation: in accordance with Section R403.3.1</td><td>Duct Insulation: as proposed</td></tr>
<tr><td rowspan="2">Thermal distribution systems</td><td>~~Duct system~~ Duct system leakage to outside:
For duct systems serving > 1,000ft^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 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>When 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>When total duct system leakage is measured without the space conditioning equipment ~~air handler~~ 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>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>
</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. Where required by the code official, testing shall be conducted by an approved party. 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 home 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 the following assumptions shall be made for both the proposed design and standard reference design.

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 §130.32

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.

i. 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.

1. Sources of hot water include water heaters, or in multiple-family buildings with central water heating systems, circulation loops or electric heat traced pipes.
2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
3. The hot water rectangle shall be shown on the floor plans and the area shall be computed to the nearest square foot.
4. 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.
5. The basement or attic shall be counted as a story when it contains the water heater.
6. 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.

j. 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.

k. 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.

l. Only sections of *ductwork* that are installed in accordance with Items 1 or 2 of Section R403.3.2, shall be assumed to be located inside *conditioned space*. All other sections of *ductwork* shall not be assumed to be located completely inside *conditioned space*.

m. Sections of *ductwork* installed in accordance with Section R403.3.3.1, shall be assumed to have an effective duct insulation R-value of R-25.

TABLE R405.4.2(2) DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	NA	0.95
Distribution system components entirely located in *conditioned space*[c]	NA	1
~~"~~Ductless~~"~~ systems[d]	1	NA

a. Default values in this table are for untested distribution systems, which must still meet minimum requirements from ~~form~~ Section R403 ~~for duct system insulation~~.

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

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

d. Ductless systems shall be allowed to have forced airflow across a coil but shall not have greater than 10 ft. of ~~any~~ ducted airflow external to the ~~manufacturer's air-handler enclosure~~ *space conditioning equipment*.

SECTION R408

ADDITIONAL EFFICIENCY REQUIREMENTS

Revise as follows:

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Portions of table not shown remain unchanged.

Measure Number	Measure Description	Credit Value								
		Climate Zone 0 & 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 4C	Climate Zone 5	Climate Zone 6	Climate Zone 7	Climate Zone 8
R408.2.4(2)	100% of *duct systems* ~~ducts~~ in *conditioned space*	4	6	8	12	12	15	17	19	20
R408.2.4(3)	≥ 80% of *ductwork* inside *conditioned space*	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.4(~~43~~)	Reduced total duct leakage	1	1	1	1	1	1	2	2	2

R408.2.4 More efficient ~~duct~~ thermal distribution system option. The thermal distribution system shall ~~meet one of the~~ comply with one of the following ~~efficiencies~~:

1. ~~100 percent of~~ The ductless thermal distribution system or hydronic thermal distribution system is located completely inside the *building thermal envelope*.

2. ~~100 percent of t~~The The *space conditioning equipment* is located inside *conditioned space*. In addition, 100 percent of the *ductwork system* ~~thermal distribution system~~ is located completely inside *conditioned space* as defined by item 1 and item 2 of Section R403.3.2.

3. The *space conditioning equipment* is located inside *conditioned space* and no less than 80 percent of *ductwork* is located completely inside *conditioned space* as defined by item 1 and item 2 of Section R403.3.2. In addition, no more than 20 percent of *ductwork* is contained within building assemblies separating unconditioned from *conditioned space* as defined by item 3 of Section R403.3.2.

4. ~~When~~ Where ~~ducts are~~ *ductwork* is located outside *conditioned space*, the total leakage ~~of the ducts,~~ of the *duct system* measured in accordance with R403.3.5, ~~shall be in accordance with~~ is one of the following:

   4.1 Where the *space conditioning equipment* ~~air handler~~ is installed at the time of testing, total leakage is not greater than 2.0 cubic feet per minute (0.94 L/s) per 100 square feet (9.29 m^2) of conditioned floor area.

   4.2 Where the *space conditioning equipment* ~~air handler~~ is not installed at the time of testing, total leakage is not greater than 1.75 cubic feet per minute (0.83 L/s) per 100 square feet (9.29 m^2) of conditioned floor area.

SECTION R502 ADDITIONS

Revise as follows:

R502.2.2 Heating and cooling systems. HVAC *ductwork* ~~ducts~~ newly installed as part of an *addition* shall comply with Section R403.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended into an *addition* Section R403.3.5 and Section R403.3.6 shall not be required.

Section 503 Alterations

Revise as follows:

R503.1.2 Heating and cooling systems. New heating and cooling systems and *ductwork* ~~duct systems~~ that are part of the alteration shall comply with Section R403 and this section . Alterations to existing heating and, cooling systems and *ductwork* ~~duct systems~~ shall comply with this section.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended to an *addition*.

R503.1.2.1 ~~Ducts~~ *Ductwork*. HVAC *ductwork* ~~ducts~~ newly installed as part of an alteration shall comply with Section R403.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended to an *addition*.

R503.1.2.3 Duct system leakage. Where an *alteration* includes any of the following, *duct systems* ~~ducts~~ shall be tested in accordance with Section R403.3.5 and shall have a total leakage less than or equal to 12.0 cubic feet per minute (339.9 L/min) per 100 square feet (9.29 m^2) of conditioned floor area:

1. **Where 25 percent or more of the registers that are part of the duct system are relocated.**
2. **Where 25 percent or more of the total length of all *ductwork* ~~ducts~~ in the *duct system* are relocated.**
3. **Where the total length of all *ductwork* ~~ducts~~ in the *duct system* is increased by 25 percent or more.**

Exception: *Duct systems* located entirely inside a *conditioned space* in accordance with Section R403.3.2.

Reason: This public comment is being submitted to achieve the following:

- **Better define what the code means when it says "ducts", "ductwork", and "duct system", by using 2021 IMC definitions, modified as needed.**
- **Use these defined terms to better clarify what is meant by "ducts in *conditioned space*" and what components are included in the "total duct leakage test"**
- **Clarify what must be tested during the total duct leakage test (i.e., ALWAYS the return 'ductwork' which now clearly includes sheetrocked plenums, but sometimes air-handler can be excluded if lower allowance is met)**
- **Reduce the use of the phrase "rough-in" and "post-construction" since that is not actually the criteria of importance**

Add a test exemption for ductless systems, including ducted systems with less than 10 ft of ductwork, when in *conditioned space* Provide a greater duct leakage allowance where a greater amount of return ductwork (ducted returns) is installed (like ENERGY STAR).

Bibliography: None

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction.
The proposed changes clarify existing provisions and do not increase the stringency of the requirements.

- RED1-285-22 – AS MODIFIED IN BLUE SINCE APPROVED BY RES HVACR-WH SUBCOMMITTEE

IECC: SECTION 202 (New), SECTION 202, R401.3, R402.2.9, TABLE R402.5.1.1, SECTION R403, R403.3, R403.3.1, R403.3.2, R403.3.3, R403.3.3.1, R403.3.4, R403.3.4.1, R403.3.5, R403.3.6, TABLE R403.3.6, R403.3.7, R403.3.8, TABLE R403.6.2, SECTION R405, R405.3.2.1, TABLE R405.4.2(1), TABLE R405.4.2(2), SECTION R408, TABLE R408.2, R408.2.4, SECTION R502, R502.2.2, SECTION R503, R503.1.2, R503.1.2.1, R503.1.2.3

Proponents: Gary Klein, representing Self (gary@garykleinassociates.com); Mark Lyles, representing California IOUs (markl@newbuildings.org); Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com)

2024 International Energy Conservation Code [RE Project]

Add new definition as follows:

AIR-HANDLING UNIT. A blower or fan used for the purpose of distributing supply air to a room, space or area.

Revise as follows:

CONDITIONED SPACE. An area, room or space that is enclosed within the *building thermal envelope* and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ~~ducts~~ *ducts*, piping or other sources of heating or cooling.

Add new definition as follows:

DAMPER. A manually or automatically controlled device to regulate draft or the rate of flow of air or combustion gases.

Revise as follows:

DUCT SYSTEM. ~~A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances~~ A system that consists of *space conditioning equipment*, *ductwork*, and ~~shall include~~ includes any apparatus installed in connection therewith.

Add new definition as follows:

DUCTWORK. The assemblies of connected *ducts*, *plenums*, boots, fittings, *dampers*, supply registers, return grilles, and filter grilles through which air is supplied to or returned from the space to be heated, ~~or~~ cooled, or ventilated. Supply ductwork delivers air to the spaces from the *space conditioning equipment*. Return ductwork conveys air from the spaces back to the *space conditioning equipment*. Ventilation ductwork conveys air to or from any space.

HEAT EXCHANGER. A device that transfers heat from one medium to another.

OCCUPIABLE SPACE. An enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only intended to be occupied occasionally and for short periods of time.

PLENUM. An enclosed portion of the building structure, other than an *occupiable space* being conditioned, that is designed to allow air movement, and thereby serve as part of the supply or return *ductwork*.

SPACE CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, ~~cleanness~~ filtration, and distribution of the air to meet the requirements of a conditioned space.

SPACE CONDITIONING EQUIPMENT. The *heat exchangers*, *air-handling units*, filter boxes, and any apparatus installed in connection therewith used to provide *space conditioning*.

Revise as follows:

R401.3 Certificate. A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory *label*, service disconnect *label* or other required labels. The certificate shall indicate the following:

9. The predominant *R*-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, *crawl space walls* and floors and *ducts* ~~ducts~~ outside *conditioned spaces*.
10. *U*-factors of fenestration and the *solar heat gain coefficient* (SHGC) of fenestration. Where there is more than one value for any component of the building envelope, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.
11. The results from any required *duct system* ~~duct system~~ and building envelope air leakage testing performed on the building.
12. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.

13. Where on-site *photovoltaic panel* systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.

14. For buildings where an Energy Rating Index score is determined in accordance with Section R406, the Energy Rating Index score, both with and without any on-site generation, shall be listed on the certificate.

15. The code edition under which the structure was permitted, the compliance path used, and where applicable, the additional efficiency measures selected for compliance with R408.

16. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

R402.2.9 Basement walls. Basement walls shall be insulated in accordance with Table R402.1.3.

Exception: Basement walls associated with unconditioned basements where ~~all of~~ the following requirements are met:

7. The floor overhead, including the underside stairway stringer leading to the basement, is insulated in accordance with Section R402.1.3 and applicable provisions of Sections R402.2 and R402.2.8.

8. There are no uninsulated ~~duct~~ *ductwork*, domestic hot water piping, or hydronic heating surfaces exposed to the basement.

9. There are no HVAC supply or return diffusers serving the basement.

10. The walls surrounding the stairway and adjacent to *conditioned space* are insulated in accordance with Section R402.1.3 and applicable provisions of Section R402.2.

11. The door(s) leading to the basement from *conditioned spaces* are insulated in accordance with Section R402.1.3 and applicable provisions of Section R402.2, and weatherstripped in accordance with Section R402.5.

12. The building thermal envelope separating the basement from adjacent *conditioned spaces* complies with Section R402.5.

TABLE R402.5.1.1 AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

Portions of table not shown remain unchanged.

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
Shafts, penetrations	*Duct* ~~Duct~~ and flue shafts to exterior or unconditioned space shall be sealed. Utility penetrations of the air barrier shall be caulked, gasketed or otherwise sealed and shall allow for expansion, contraction of materials and mechanical vibration.	Insulation shall be fitted tightly around utilities passing through shafts and penetrations in the building thermal envelope to maintain required *R*-value.
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be air sealed in accordance with Section R402.5.5.	Recessed light fixtures installed in the building thermal envelope shall be airtight and IC rated, and shall be buried in or surrounded with insulation.
Electrical,communication, and other equipment boxes, housings, and enclosures	Boxes, housing, and enclosures that penetrate the air barrier shall be caulked, taped, gasketed, or otherwise sealed to the air barrier element being penetrated. All concealed openings into the box, housing, or enclosure shall be sealed. The continuity of the air barrier shall be maintained around boxes, housings, and enclosures that penetrate the air barrier. Alternatively, air-sealed boxes shall be installed in accordance with R402.5.6.	Boxes, housing, and enclosures shall be ~~burried~~ buried in or surrounded by insulation.
HVAC register boots	HVAC supply and return register boots ~~that penetrate~~ ~~building thermal envelope~~ shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.	HVAC supply and return register boots located ~~in~~ within a ~~the~~ ~~building's thermal envelope~~ *building thermal envelope* assembly shall be buried ~~burried~~ in or ~~and~~ surrounded by insulation.

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

d. Insulation full enclosure is not required in unconditioned/ventilated attic spaces and at rim joists.

SECTION R403 SYSTEMS

Revise as follows:

R403.3 Duct systems. ~~Ducts and air handlers~~ *Duct systems* shall be installed in accordance with Sections R403.3.1 through R403.3.~~8~~7~~9~~.

Exception: ~~*Ducts* serving ventilation systems~~ Ventilation *ductwork* ~~that~~ is ~~are~~ not integrated with *duct systems* serving heating or cooling systems.

R403.3.1 ~~Ducts~~ Ductwork located outside conditioned space. Supply and return *ductwork* ~~*ducts*~~ located outside *conditioned space* shall be insulated to an *R*-value of not less than R-8 for *ducts* 3 inches (76 mm) in diameter and larger and not less than R-6 for *ducts* smaller than 3 inches (76 mm) in diameter. *Ductwork* ~~*Ducts*~~ buried beneath a building shall be insulated as required per this section or have an equivalent *thermal distribution efficiency*. Underground *ductwork* ~~*ducts*~~ utilizing the *thermal distribution efficiency* method shall be listed and *labeled* to indicate the *R*- value equivalency.

R403.3.2 Ducts systems located in conditioned space. For ~~ductwork~~ *duct systems* to be considered inside a *conditioned space*, the *space conditioning equipment* shall be located completely ~~within the *continuous air barrier* and within~~ on the conditioned side of the *building thermal envelope*. The *ductwork* ~~it~~ shall comply with ~~one of~~ the following as applicable:

~~4.~~ The ~~duct system~~ *ductwork* shall be located completely ~~within the *continuous air barrier* and within~~ on the conditioned side of the *building thermal envelope.*

5. *Ductwork* ~~Ductwork~~ in ventilated attic spaces or unvented attics with vapor diffusion ports shall be buried within ceiling insulation in accordance with Section R403.3.3 and ~~all of~~ shall comply with the following ~~conditions shall exist~~:

5.1. ~~The air handler is located completely within the *continuous air barrier* and within the *building thermal envelope*.~~

2.21. The ~~duct~~ *ductwork* leakage, as measured either by a rough-in test of the supply and return ~~ducts~~ *ductwork* or a post-construction ~~total~~ *duct system* leakage test to outside the *building thermal envelope* in accordance with Section R403.3. 5~~6~~, ~~is less than or equal to~~ is not greater than 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area* served by the *duct system*.

2.~~3~~2. The ceiling insulation *R*-value installed against and above the insulated ~~duct~~ *ductwork* is greater than or equal to the proposed ceiling insulation *R*-value, less the *R*-value of the insulation on the ~~duct~~ *ductwork*.

6. *Ductwork* ~~located in~~ contained within wall or floor ~~building~~ assemblies separating unconditioned from conditioned space shall comply with the following:

6.1. A *continuous air barrier* shall be installed as part of the building assembly between the ~~duct~~ *ductwork* and the unconditioned space.

6.2. ~~Ducts~~ *Ductwork* shall be installed in accordance with Section R403.3.1.

Exception: Where the building assembly cavities containing ~~ducts~~ *ductwork* have been air sealed in accordance with Section R402.5.1, duct insulation is not required.

6.3. Not less than R-10 ~~assembly~~ insulation, ~~and~~ or not less than 50 percent of the ~~assembly~~ ~~insulation~~ required insulation R-value specified in Table R402.1.3, whichever is greater, shall be located between the ~~duct~~ *ductwork* and the unconditioned space.

~~3.4 For ducts in these building assemblies to be considered within conditioned space, the air handling equipment shall be installed within conditioned space.~~

Segments of *ductwork* contained within ~~these~~ such building assemblies shall not be considered completely inside *conditioned space* ~~in~~ for compliance with Sections R405 or R406.

R403.3.3 Ductwork ~~Ducts~~ buried within ceiling insulation. Where supply and return *ductwork* ~~air ducts~~ ~~are~~ is partially or completely buried in ceiling insulation, such *ductwork* ~~ducts~~ shall comply with ~~all of~~ the following:

5. The supply and return ~~ducts~~ *ductwork* shall be insulated with ~~have an insulation *R*-value~~ not less than R-8 insulation.

6. At all points along ~~each duct~~ the *ductwork*, the sum of the ceiling insulation *R*-value against and above the top of the ~~duct~~ *ductwork*, and against and below the bottom of the ~~duct~~ *ductwork*, shall be not less than R-19, excluding the *R*-value of the duct insulation.

7. In Climate Zones 0A, 1A, 2A and 3A, the supply ~~ducts~~ *ductwork* shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-13 and in compliance with the vapor retarder requirements of Section 604.11 of the *International Mechanical Code* or Section M1601.4.6 of the *International Residential Code*, as applicable**.**

Exception: Sections of the supply ~~ducts~~ *ductwork* that are less than 3 feet (914 mm) from the supply outlet ~~shall not be required to comply with these requirements~~.

8. In Climate Zones 0A, 1A, 2A and 3A ~~when~~ where installed in an unvented attic with vapor diffusion ports, the supply ~~ducts~~ *ductwork* shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-8 and in compliance with the vapor retarder requirements of Section 604.11 of the *International Mechanical Code* or Section M1601.4.6 of the *International Residential Code*, as applicable.

Exception: Sections of the supply ~~ducts~~ *ductwork* duct that are less than 3 feet (914 mm) from the supply outlet ~~shall not be required to comply with these requirements~~.

8.1 Air permeable insulation installed in unvented attics shall ~~be in compliance~~ comply with ~~the requirements of~~ Section R806.5.5.2 of the *International Residential Code*.

R403.3.3.1 Effective R-value of deeply buried ducts. Where ~~complying using Section R405, the Building Simulated Performance Compliance Option in accordance with Section R401.2.2,~~ sections of ~~ducts~~ *ductwork* that are installed in accordance with Section R403.3.3 surrounded with blown-in attic insulation having an *R*-value of R-30 or greater, and located such that the top of the ~~duct~~ *ductwork* is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation *R*-value of R-25.

R403.3.4 Sealing. ~~Ducts, air handlers~~ *Ductwork*, *air-handling units* and filter boxes shall be sealed. Joints and seams shall comply with ~~either~~ the International Mechanical Code or the International Residential Code, as applicable.

R403.3.4.1 Sealed ~~air handler~~ air-handling unit. ~~Air handlers~~ *Air-handling units* shall have a manufacturer's designation for an air leakage ~~of~~ not greater than 2 percent of the design airflow rate when tested in accordance with ASHRAE 193.

R403.3.5 Duct system testing. Each *duct system* ~~ducts system~~ shall be tested for air leakage in accordance with ANSI/RESNET/ICC 380 or ASTM E1554. Total leakage shall be measured with a pressure differential of 0.1 inch water gauge ~~w.g.~~(25 Pa) across the ~~system~~ *duct system* and shall include the measured leakage from ~~both~~ the supply and return *ductwork*. ~~Registers shall be sealed during the test.~~ A written report of the test results shall be signed by the party conducting the test and provided to the *code official*. *Duct system* ~~Duct system~~ leakage testing at either rough-in or post-construction shall be permitted with or without the installation of registers or grilles. Where installed, registers and grilles shall be ~~temporarily~~ sealed during the test. Where registers and grilles are not installed, the face of the register boots shall be ~~temporarily~~ sealed during the test.

Exceptions:

4. Testing shall not be required for *duct systems* ~~duct systems~~ serving ventilation systems that are not integrated with *duct systems* ~~duct~~ ~~systems~~ serving heating or cooling systems.

5. Testing shall not be required where there is not more than 10 feet of total *ductwork* external to the *space conditioning equipment* and both the following are met :

   a. The *duct system* is located entirely within *conditioned space* .

   b. The *ductwork* does not include *plenums* constructed of building cavities or ~~sheetrock~~ gypsum board.

6. Where the *space conditioning equipment* is not installed, testing shall be permitted. The total measured leakage of the supply and return *ductwork* shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area*.

~~2~~ 4. Where tested in accordance with Section R403.3.7, testing of each *duct system* ~~duct system~~ is not required.

R403.3.6 Duct system leakage. The total measured ~~duct system~~ *duct system* leakage shall not be greater than the values in Table R403.3.6, based on the conditioned floor area, number of ducted returns, and location of the *duct system*. For buildings complying with Section R405 or R406, where ~~duct system~~ *duct system* ~~duct system~~ leakage to outside is tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554, the leakage to outside value shall not be used for compliance with this section, but shall be permitted to be used in the calculation procedures of Section R405 and R406.

TABLE R403.3.6 MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

~~ROUGH IN~~	~~POST CONSTRUCTION~~	
~~Duct systems serving more than 1,000 ft^2 of conditioned floor area~~	~~cfm/100 ft^2 (LPM/9.29 m^2)~~	~~cfm/100 ft^2 (LPM/9.29 m^2)~~
~~Air handler is not installed~~	~~3 (85)~~	~~NA~~
~~Air handler is installed~~	~~4 (113.3)~~	~~4 (113.3)~~
~~Duct systems located in conditioned space, with air handler installed~~	~~8 (226.6)~~	~~8 (226.6)~~
~~Duct systems serving less than or equal to 1,000 ft^2 of conditioned floor area~~	~~cfm (LPM)~~	~~cfm (LPM)~~
~~Air handler is not installed~~	~~30 (849.5)~~	~~NA~~
~~Air handler is installed~~	~~40 (1132.7)~~	~~40 (1132.7)~~
~~Duct systems located in conditioned space, with air handler installed~~	~~80 (2265.4)~~	~~80 (2265.4)~~

	Duct systems serving more than 1,000 ft² of conditioned floor area		*Duct systems* serving ~~less than or equal to~~ 1,000 ft² or less of conditioned floor area
	cfm/100 ft² (LPM/9.29 m²)		cfm (LPM)
	Number of ducted returns [a]		
	< 3	≥ 3	Any
Space conditioning equipment is not installed [b, e]	3 (85)	4 (113~~.3~~)	30 (850 ~~849.5~~)
All components of the *duct system* are installed	4 (113~~.3~~)	6 (170)	40 (1133~~2.7~~)
~~*Space* conditioning equipment~~ is not installed, ~~but the~~ *ductwork* is located entirely in *conditioned space* [cd]	6 (170)	8(227)	60 (1699)
All components of the *duct system* are installed and entirely located in *conditioned space* [c]	8 (227~~6.6~~)	12(340)	80 2265.~~4~~)

e. A ducted return is a *duct* made of sheet metal or flexible *duct* that connects one or more return grilles to the return-side inlet of the *air-handling unit*. Any other ~~approach~~ method to convey air from return or transfer grille(s) to the *air-handling unit* does not constitute a ducted return for the purpose of determining maximum total *duct system* leakage allowance.

f. ~~Where the *space conditioning equipment* is not installed, *duct system* testing shall be permitted and shall include the measured leakage from both the supply and return *ductwork*. *Duct system* testing shall not be performed if the return *ductwork* is not installed.~~ *Duct system* testing is permitted where *space conditioning equipment* is not installed, provided the return *ductwork* is installed, and the measured leakage from the supply and return ductwork is included.

g. For *duct systems* to be considered inside a *conditioned space*, where the *ductwork* is located in ventilated attic spaces or unvented attics with vapor diffusion ports, *duct system* leakage to outside ~~shall~~ must comply with Item 2.1 of Section R403.3.2. ~~be measured in accordance with ANSI/RESNET/ICC 380 or ASTM E1554 and shall be less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of *conditioned floor area* served by the *duct system*~~.

h. Prior to certificate of occupancy, where the *air-handling unit* is not verified as being located in ~~un~~*conditioned space*, the total *duct system* leakage must be re-tested.

R403.3.7 Dwelling unit sampling. For buildings with eight or more *dwelling units* the duct systems in the greater of seven, or 20 percent of the *dwelling units* in the building shall be tested, including a top floor unit, a ground floor unit, a middle floor unit, and the unit with the largest conditioned floor area. Where buildings have fewer than eight *dwelling units*, the duct systems in each unit shall be tested. Where the leakage ~~rate~~ of a *duct system* is greater than the maximum permitted *duct system* leakage ~~rate~~, corrective actions shall be made to the *duct system* ~~system~~ and the *duct system* shall be retested until it passes. For each tested *dwelling unit* that has a greater total *duct system* leakage ~~rate~~ than the maximum permitted *duct system* leakage ~~rate~~, an additional three *dwelling units*, including the corrected unit, shall be tested.

R403.3.~~8~~2 **Building cavities.** *Building* framing cavities shall not be used as ~~ducts~~ *ductwork* or *plenums*.

R403.3.1 Duct System Design. *Duct systems* serving one or two *dwelling units* shall be designed and sized in accordance with ANSI/ACCA Manual D. *Duct systems* serving more than two *dwelling units* shall be sized in accordance with the ASHRAE Handbook of Fundamentals, ANSI/ACCA Manual D, or other equivalent computation procedure.

TABLE R403.6.2 WHOLE-DWELLING MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]
Portions of table not shown remain unchanged.

SYSTEM TYPE	AIRFLOW RATE (CFM)	MINIMUM EFFICACY (CFM/WATT)	TEST PROCEDURE

~~Air-handler~~ *Air-handling unit* that is integrated to tested and *listed* HVAC equipment	Any	1.2	Outdoor airflow as specified. *Air-handling unit* ~~Air-handler~~ fan power determined in accordance with the HVAC appliance's test method referenced by Section C403.3.2 of the IECC-Commercial Provisions.

For SI: 1 cubic foot per minute = 0.47 L/s.

a. Design outdoor airflow rate/watts of fan used.

SECTION R405 SIMULATED BUILDING PERFORMANCE

Revise as follows:

R405.3.2.1 Compliance report for permit application. A compliance report submitted with the application for building permit shall include the following:

7. Building street address, or other *building site* identification.
8. The name of the individual performing the analysis and generating the compliance report.
9. The name and version of the compliance software tool.
10. Documentation of all inputs ~~entered into~~ to the software used to produce the results for the reference design ~~and,~~ or the rated home.
11. A certificate indicating that the proposed design complies with Section R405.3. The certificate shall document the building components' energy specifications that are included in the calculation including: component-level insulation *R*-values or *U*-factors; ~~duct system~~ *duct system* and building envelope air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.
12. Where a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated home.

TABLE R405.4.2(1) SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

Portions of table not shown remain unchanged.

<table>
<tr><th>BUILDING COMPONENT</th><th>STANDARD REFERENCE DESIGN</th><th>PROPOSED DESIGN</th></tr>
<tr><td></td><td>Duct location</td><td>Duct location: as proposed</td></tr>
<tr><td></td><td>
<table>
<tr><th>Foundation type</th><th>Slab on grade</th><th>Unconditioned crawl space</th><th>Basement or conditioned crawl space</th></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 crawl space

All other: 75% in unconditioned crawlspace and 25% inside conditioned space</td><td><u>75</u>~~50~~% inside conditioned space

<u>25</u>~~50~~% unconditioned attic</td></tr>
</table>
</td><td></td></tr>
<tr><td></td><td>Duct Insulation: in accordance with Section R403.3.1</td><td>Duct Insulation: as proposed</td></tr>
<tr><td>Thermal distribution systems</td><td>~~Duct system~~ <u>Duct system</u> leakage to outside:
For <u>duct systems</u> serving > 1,000ft^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 <u>duct systems</u> serving ≤ 1,000ft^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 measure <u>d</u> 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>~~When~~ Where <u>duct system</u> 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>~~When~~ Where total <u>duct system</u> leakage is measured without the <u>space conditioning</u> equipment ~~air handler~~ 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><u>Distribution System Efficiency (DSE):</u>

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>
</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. Where required by the code official, testing shall be conducted by an approved party. 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 home 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 the following assumptions shall be made for both the proposed design and standard reference design.

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 §130.32

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.

i. 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.

1. Sources of hot water include water heaters, or in multiple-family buildings with central water heating systems, circulation loops or electric heat traced pipes.
2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
3. The hot water rectangle shall be shown on the floor plans and the area shall be computed to the nearest square foot.
4. 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.
5. The basement or attic shall be counted as a story when it contains the water heater.
6. 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.

j. 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.

k. 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.

l. Only sections of *ductwork* that are installed in accordance with Items 1 or 2 of Section R403.3.2, ~~shall~~ are ~~be~~ assumed to be located completely inside *conditioned space*. All other sections of *ductwork* ~~shall~~ are not ~~be~~ assumed to be located completely inside *conditioned space*.

m. Sections of *ductwork* installed in accordance with Section R403.3.3.1, ~~shall~~ are ~~be~~ assumed to have an effective duct insulation R-value of R-25.

TABLE R405.4.2(2) DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	NA	0.95
Distribution system components entirely located in *conditioned space*[c]	NA	1
"Ductless" systems[d]	1	NA

e. Default values in this table are for untested distribution systems, which must still ~~meet minimum requirements from~~ form comply with Section R403 ~~for duct system insulation~~.

f. Hydronic systems ~~shall~~ means those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed-loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.

g. Entire system in *conditioned space* ~~shall~~ means that no component of the distribution system, ~~including the air-handling unit,~~ is located outside of the *conditioned space*.

h. Ductless systems ~~shall be~~ are allowed to have forced airflow across a coil but ~~shall~~ must not have greater than 10 ft. of ~~any~~ ducted airflow external to the ~~manufacturer's air-handler enclosure~~ *space conditioning equipment*.

SECTION R408

ADDITIONAL EFFICIENCY REQUIREMENTS

Revise as follows:

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Portions of table not shown remain unchanged.

Measure Number	Measure Description	Credit Value								
		Climate Zone 0 & 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 4C	Climate Zone 5	Climate Zone 6	Climate Zone 7	Climate Zone 8
R408.2.4(2)	100% of *duct systems* ~~ducts~~ in *conditioned space*	4	6	8	12	12	15	17	19	20
R408.2.4(3)	≥ 80% of *ductwork* inside *conditioned space*	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
R408.2.4(~~4~~3)	Reduced total duct leakage	1	1	1	1	1	1	2	2	2

R408.2.4 More efficient ~~duct~~ thermal distribution system option. The thermal distribution system shall ~~meet one of the~~ comply with one of the following ~~efficiencies~~:

5. ~~100 percent of~~ The ductless thermal distribution system or hydronic thermal distribution system is located completely ~~inside~~ on the conditioned side of the *building thermal envelope*.

6. ~~100 percent of t~~The *space conditioning equipment* is located inside *conditioned space*. In addition, 100 percent of the *ductwork* ~~*system* thermal distribution system~~ is located completely inside *conditioned space* as defined by item 1 and item 2 of Section R403.3.2.

7. The *space conditioning equipment* is located inside *conditioned space* and no less than 80 percent of *ductwork* is located completely inside *conditioned space* as defined by item 1 and item 2 of Section R403.3.2. In addition, no more than 20 percent of *ductwork* is contained within building assemblies separating unconditioned from *conditioned space* as defined by item 3 of Section R403.3.2.

8. ~~When~~ Where ~~ducts are~~ *ductwork* is located outside *conditioned space*, the total leakage ~~of the ducts,~~ of the *duct system* measured in accordance with R403.3.5, ~~shall be in accordance with~~ is one of the following:

8.1 Where the *space conditioning equipment* ~~air handler~~ is installed at the time of testing, total leakage is not greater than 2.0 cubic feet per minute (0.94 L/s) per 100 square feet (9.29 m^2) of conditioned floor area.

8.2 Where the *space conditioning equipment* ~~air handler~~ is not installed at the time of testing, total leakage is not greater than 1.75 cubic feet per minute (0.83 L/s) per 100 square feet (9.29 m^2) of conditioned floor area.

SECTION R502 ADDITIONS

Revise as follows:

R502.2.2 Heating and cooling systems. HVAC *ductwork* ~~ducts~~ newly installed as part of an *addition* shall comply with Section R403.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended into an *addition* Section R403.3.5 and Section R403.3.6 shall not be required.

Section 503 Alterations

Revise as follows:

R503.1.2 Heating and cooling systems. New heating and cooling systems and *ductwork* ~~duct systems~~ that are part of the alteration shall comply with Section R403 and this section . Alterations to existing heating and, cooling systems and *ductwork* ~~duct systems~~ shall comply with this section.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended to an *addition*.

R503.1.2.1 ~~Ducts~~ *Ductwork*. HVAC *ductwork* ~~ducts~~ newly installed as part of an alteration shall comply with Section R403.

Exception: Where *ductwork* ~~ducts~~ from an existing heating and cooling system ~~are~~ is extended to an *addition*.

R503.1.2.3 Duct system leakage. Where an *alteration* includes any of the following, *duct systems* ~~ducts~~ shall be tested in accordance with Section R403.3.5 and shall have a total leakage less than or equal to 12.0 cubic feet per minute (339.9 L/min) per 100 square feet (9.29 m^2) of conditioned floor area:

4. Where 25 percent or more of the registers that are part of the duct system are relocated.
5. Where 25 percent or more of the total length of all *ductwork* ~~ducts~~ in the *duct system* are relocated.
6. Where the total length of all *ductwork* ~~ducts~~ in the *duct system* is increased by 25 percent or more.

Exception: *Duct systems* located entirely inside a *conditioned space* in accordance with Section R403.3.2.

Reason: This public comment is being submitted to achieve the following:

- **Better define what the code means when it says "ducts", "ductwork", and "duct system", by using 2021 IMC**
- **definitions, modified as needed. Use these defined terms to better clarify what is meant by "ducts in *conditioned space*" and what components are included in the "total duct leakage test"**
- **Clarify what must be tested during the total duct leakage test (i.e., ALWAYS the return 'ductwork' which now clearly includes sheetrocked plenums, but sometimes air-handler can be excluded if lower allowance is met)**
- **Reduce the use of the phrase "rough-in" and "post-construction" since that is not actually the criteria of importance**
- **Add a test exemption for ductless systems, including ducted systems with less than 10 ft of ductwork, when in**
- ***conditioned space* Provide a greater duct leakage allowance where a greater amount of return ductwork (ducted returns) is installed (like ENERGY STAR).**

Bibliography: None

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. The proposed changes clarify existing provisions and do not increase the stringency of the requirements.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-308-22 Max. total duct system leakage
CDP ID #	1094
Code	IECC RE
Code Section(s)	R403.3.6 table
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Discussion opened with a presentation from the Chair HVACR working Group. The proposal is an editorial change – changes are incorporated into RED1-285. Motion to disapprove properly seconded. Reason the editorial change was rolled into RED1-285-22. No discussion and no one in option of the disapproval. Subcommittee vote to disapprove 9/0/0
Recommendation	Subcommittee motion is to disapprove as submitted
Vote	9/0/0
Recommendation Date	4/3/2023
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 #	RED1-307-22 Duct leakage table
CDP ID #	1066
Code	IECC RE
Code Section(s)	R403.3.6 table
Location	base
Proponent	Robby Schwarz robby@btankinc.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Subcommittee started to hear this proposal on 3/27/2023- Proponent Robby Schwarz not present. Motion to table with a second carried. Table the motion to the next meeting. Vote to table approved 9/0/0- subcommittee meeting 4/3/2023 - Recommendation from the Chair of HVACR and Water Heating Working Group Gary Klein. Followed by a motion and a second to disapprove. Proponent Robby Schwarz was not able to attend the subcommittee meeting. Vote to disapprove carried 7/0/2
Recommendation	Subcommittee recommendation is to Disapprove as submitted.
Vote	7/0/2
Recommendation Date	4/3/2023
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 #	RED1-305-22 Clarify duct location in ceiling
CDP ID #	1339
Code	IECC RE
Code Section(s)	R403.3.3
Location	base
Proponent	Jay Crandell jcrandell@aresconsulting.biz
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Discussion opened with a motion to disapprove. The reason for the motion and a second is because the language in this proposal has been incorporated into RED1-285-22.
Recommendation	The subcommittee recommendation is to disapprove as submitted.
Vote	8/0/0 for disapproval
Recommendation Date	4/3/2023
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 #	RED1-306-22 Ducts buried within ceiling insulation edit
CDP ID #	1093
Code	IECC RE
Code Section(s)	R403.3.3
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Discussion opened with a motion to disapprove. The reason for the motion and a second is because the language in this proposal has been incorporated into RED1-285-22.
Recommendation	Recommendation is to Disapprove
Vote	8/0/0 for disapproval
Recommendation Date	4/3/2023
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 #	RED1-302-22 Duct insulation exception
CDP ID #	1000
Code	IECC RE
Code Section(s)	R403.3.2
Location	base
Proponent	Vladimir Kochkin vkochkin@nahb.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Ducts working group Chair Gary Klein recommendations from the working group is to approve. Proponent Vladimir Kochkin presented the proposal specifics. Main focus of the proposal is to clean up the language in R403.3.2 clarifying the provisions. Motion and a proper second to approve discussion moved forward. Vladamir answered questions including regarding exception.
Recommendation	HVACR recommendation is to approve
Vote	vote to approve 7/1/1
Recommendation Date	4/3/2023
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 #	RED1-303-22 Duct insulation exception
CDP ID #	1191
Code	IECC RE
Code Section(s)	R403.3.2
Location	base
Proponent	Rob Salcido victor.salcido@pnnl.gov
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Ducts working group Chair Gary Klein made a recommendation from the working group to disapprove. Victor (Rob) Salcido proponent presented the reason for the proposal and the goal of the proposed change. Motion to disapprove with a proper second opened the subcommittee discussion. Disapproval carried with a vote to disapprove 8/0/1 Gayathri made a suggestion to submit a modification when the proposal is heard in Main.
Recommendation	Recommendation is to disapprove the as submitted proposal
Vote	vote to disapprove 8/0/1
Recommendation Date	4/3/2023
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 #	RED1-359-22 More efficient duct system
CDP ID #	1432
Code	IECC RE
Code Section(s)	R408.2.4
Location	base
Proponent	Greg Johnson gjohnsonconsulting@gmail.com
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Motion to approve with a proper second. Little discussion motion to approved carried with a vote of 10/0/0
Recommendation	Subcommittee recommendation is to approve
Vote	10/0/0
Recommendation Date	
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 #	RED1-342-22 Electric readiness space heating option
CDP ID #	1256
Code	IECC RE
Code Section(s)	R408.2 Table
Location	base
Proponent	Mark Lyles markl@newbuildings.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Proposal presented and the discussion opened with a motion to disapprove with a proper second. The proposal is a credit in R408 for gas heating readiness. Comments and questions 1. Comment; this does not belong in the main body of the code 2. Question; PNNL range of point values by climate zones? Vote to disapprove carried with a vote of 5/4/0
Recommendation	Recommendation is to disapprove
Vote	vote to disapprove 7/0/2
Recommendation Date	4/3/2023
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 #	RED1-343-22 H/ERV Option
CDP ID #	1330
Code	IECC RE
Code Section(s)	R408.2 Table
Location	base
Proponent	Mark Lyles markl@newbuildings.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Proposal presented. Gary Klein motion to approve "AS Modified" with with a second from Kevin Rose. Vladimir supportive of the motion to approve C/O proponent of the proposal. PNNL is considering. Motion to approved "AS modified" carried with a vote of 7/0/2
Recommendation	Recommendation to Approve "AS modified"
Vote	7/0/2
Recommendation Date	4/3/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee___x _____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	

RED1-343-22 MODIFICATION (shown in red)

Modification does the following things:

1. Replaces 2021 IMC definition for 'balanced ventilation' with a 2024 IRC definition for 'balanced ventilation system', and then revised as needed where the term is used
2. Adds the less than sign, decimal, and "0" to the applicable rows in the table
3. Replaces the credits awarded in CZ 6, 7, & 8 with 'TBD', given that 2.5 ACH50 and ERV/HRVs are now required in those CZs and the points may need to be re-calculated by PNNL
4. Updated the last sentence in R408.2.5 to match PCD1 as updated after Errata
5. In that same sentence, add "NMT"

IECC: SECTION 202 (New), TABLE R408.2, R408.2.5

Proponents: Mark Lyles, representing California IOUs (markl@newbuildings.org); Gayathri Vijayakumar, representing Steven Winter Associates, Inc. (gvijayakumar@swinter.com); Vladimir Kochkin, representing NAHB (vkochkin@nahb.org); Jennifer Amann, representing ACEEE (jamann@aceee.org)

2024 International Energy Conservation Code [RE Project]

Add new definition as follows:

BALANCED VENTILATION SYSTEM. ~~Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~ A ventilation system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10% of the average of the two airflow rates.

Revise as follows:

TABLE R408.2 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Measure Number	Measure Description	Credit Value								
		Climate Zone 0 & 1	Climate Zone 2	Climate Zone 3	Climate Zone 4	Climate Zone 4C	Climate Zone 5	Climate Zone 6	Climate Zone 7	Climate Zone 8
R408.2.5(1)	ERV or HRV installed	TBD	TBD	TBD	TBD	TBD	TBD	0	0	0
R408.2.5(~~1~~2)	≤ 2.0 ACH50 ~~air leakage rate~~ with ERV or HRV installed	1	4	5	10	10	13	TBD ~~15~~	TBD ~~8~~	TBD ~~8~~
R408.2.5(~~2~~3)	≤ 2.0 ACH50 ~~air leakage rate~~ with a	2	3	2	4	4	5	TBD ~~6~~	TBD ~~6~~	TBD ~~6~~

	balanced ventilation system									
R408.2.5(~~3~~4)	≤ 1.5 ACH50 ~~air leakage rate~~ with ERV or HRV installed	2	4	6	12	12	15	TBD ~~18~~	TBD ~~11~~	TBD ~~11~~
R408.2.5(45)	≤ 1.0 ACH50 ~~air leakage rate~~ with ERV or HRV installed	2	5	6	14	14	17	TBD ~~21~~	TBD ~~14~~	TBD ~~14~~

R408.2.5 Improved air sealing and efficient ventilation system option. ~~The measured air leakage rate shall be less than or equal to 3.0 ACH50, with either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed. Minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03 m3/min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).~~ The measured air leakage rate and ventilation system shall meet ~~be~~ one of the following:

1. ~~Less than or equal to 2.0 ACH50, with e~~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.
~~2~~3. Less than or equal to 2.0 ACH50, with a *balanced ventilation system* ~~as defined in Section 202 of the 2021 *International Mechanical Code*~~.
~~3~~4. Less than or equal to 1.5 ACH50, with either an ERV or HRV installed.
~~4~~5. Less than equal to 1.0 ACH50, with either an ERV or HRV installed.

In addition, for measures requiring either an ERV or HRV, ~~M~~ ~~minimum HRV and ERV requirements, measured at the lowest tested net supply airflow, shall be greater than or equal to 75 percent Sensible Recovery Efficiency (SRE), less than or equal to 1.1 cubic feet per minute per watt (0.03 m^3/min/watt) and shall not use recirculation as a defrost strategy. In addition, the ERV shall be greater than or equal to 50 percent Latent Recovery/Moisture Transfer (LRMT).~~ HRV and ERV Sensible Recovery Efficiency (SRE) shall be no less than 75 percent at 32°F (0°C), at the lowest listed net airflow. ERV Latent Recovery/Moisture Transfer (LRMT) or Net Moisture Transfer (NMT) shall be no less than 50 percent, at the lowest listed net airflow. In Climate Zone 8, recirculation shall not be used as a defrost strategy.

International Energy Conservation Code
Code Change Proposal Tracking Sheet

Proposal #	RED1-352-22 Water heater efficiencies
CDP ID #	1462
Code	IECC RE
Code Section(s)	R408.2.2
Location	base
Proponent	Shannon Corcoran SCorcoran@aga.org
Proposal Status	SC rev
Subcommittee	RE HVACR & WH
Subcommittee Notes	Motion Gary Klein and a second Deam Potter to disapprove. I am sorry but I do not have many notes. The concern was regarding meeting federal standard. Motion to disapprove carried with a vote of 8/0/1
Recommendation	Recommendation is to disapprove
Vote	vote to disapprove 8/0/1
Recommendation Date	4/3/2023
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 #	RED1-077-22 R408 mech equipment edit
CDP ID #	1239
Code	IECC RE
Code Section(s)	R408.2 Table
Location	base
Proponent	Amy Boyce amy.boyce@imt.org
Proposal Status	SC rev
Subcommittee	RE HVACR
Subcommittee Notes	Proponent is not able to be on the call. Presenting Cherylyn Kelly. R408 options. Correction of language in the code that allows a home to meet a lower code. With a motion and a proper second to Disapprove the floor opened to discuss. Some in support and some agree with disapproval. Motion to disapprove carried with a vote of 7/1/1
Recommendation	Subcommittee recommendation is to disapproved
Vote	Disapprove with a vote of 7/1/1
Recommendation Date	4/3/2023
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 #	RED1-337-22 Air leakage and mech ventilation reorg
CDP ID #	1469
Code	IECC RE
Code Section(s)	R405.4.2(1) Table
Location	base
Proponent	Mike Moore mmoore@statorllc.com
Proposal Status	SC rev
Subcommittee	RE HVACR
Subcommittee Notes	Mike Moore presented this proposal as an editorial and sync with other sections and table of proposals. Motion to approve Gary Heikkinen and a second from Mary Koban. Note this proposal was requested to be moved to modeling and since this meeting 1/30/2023 and vote Modeling has the proposal.
Recommendation	Subcommittee recommendation is to approve this motion
Vote	8/0/0
Recommendation Date	1/30/2023
Next Step	To Subcommittee To Advisory Group_____ To Consensus Committee___x_____
Consensus Committee	
Committee Response	
Vote	Affirmative_____ Negative_____ Table_____ To Subcommittee_____
Date	