**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 Zone0 & 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 *balanced ventilation system* | 2 | 3 | 2 | 4 | 4 | 5 | TBD ~~6~~ | TBD ~~6~~ | TBD ~~6~~ |
| 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(~~4~~5) | ≤ 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.

**RED1-329-22 proposed modification**

**~~R403.8 Systems serving multiple dwelling units.~~** ~~Systems serving multiple dwelling units shall comply with Sections C403 and C404 of the International Energy Conservation Code—Commercial Provisions instead of Section R403.~~

**R403.6 Mechanical ventilation.** The *buildings* complying with Section R402.5.1 shall be provided with *ventilation* that complies with the requirements of Section M1505 of the *International Residential Code* or *International Mechanical Code*, as applicable, or with other *approved* means of *ventilation*. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the *ventilation* system is not operating.

(Insert and renumber following sections)

***R403.6.1. Fans and fan controls serving multiple dwelling units.*** *Fans in HVAC systems serving multiple dwelling units shall comply with Section C403.8 of the International Energy Conservation Code.*

(insert new section)

**R403.5.2** Controls for hot water storage. The controls on pumps that circulate water between a water heater and a heated-water storage tank shall limit operation of the pump from heating cycle startup to not greater than 5 minutes after the end of the cycle.

(modify as follows)

**R403.8 Mechanical systems located outside of the building thermal envelope.** Mechanical systems providing heat outside of the thermal envelope of a building shall comply with Sections R408.1 through R408.4.

**R403.8.1 Heating outside a building.** Systems installed to provide heat outside a building shall be radiant systems. Such heating systems shall be controlled by an occupancy sensing device or a timer switch, so that the system is automatically de-energized when occupants are not present.

**~~R403.9~~ R403.8.2 Snow melt and ice system controls.** Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is greater than 50°F (10°C) and precipitation is not falling, and an automatic or manual control that will allow shutoff when the outdoor temperature is greater than 40°F (4.8°C).

**~~R403.10~~ R403.8.3 Roof and gutter deicing controls** Roof and gutter deicing systems, including but not limited to self-regulating cable, shall include automatic controls configured to shut off the system when the outdoor temperature is above 40°F (4.8°C) maximum and shall include one of the following:

1. A moisture sensor configured to shut off the system in the absence of moisture, or

2. A programmable timer configured to shut off the system for 8 hours minimum at night.

**R403.8.4 Freeze protection system controls.** Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, shall include automatic controls configured to shut off the systems when outdoor air temperatures are above 40°F (4°C) or when the conditions of the protected fluid will prevent freezing.

**Reason:** This modification brings over those sections of C403 and C404 that do not have a corresponding section in the IECC-R. Despite the goal of bringing all such requirements into the IECC-R, the fan power requirements of C403.8 are quite extensive and largely new since the 2021 IECC. Reluctantly, it appears the better option at this time to maintain a reference to those provisions until the 2027 development cycle when additional time and expertise is available to help bring those provisions into the IECC-R.

RED1-344-22 (Modified)

**IECC: R408.2.2, TABLE R408.2**

**Proponents:**

Robert Glass, representing Daikin Comfort Technologies

### 2024 International Energy Conservation Code [RE Project]

**Revise as follows:**

R408.2.2 More efficient HVAC equipment performance option.

Heating and cooling *equipment* shall meet one of the following efficiencies~~:~~.. In situations where multiple heating and/or cooling systems are installed (section 408.2.2), credits shall be given based on weighted average of square footage of conditioned space served by each unit.

~~Centrally Ducted Systems:~~

* 1. ​High Performance Cooling (Option 1) - ​​​Greater than or equal to 16.0 SEER2 air conditioner.
* 2. High Performance Cooling (Option 2) - Greater than or equal to ~~18 SEER (~~16.9 SEER2~~) and 14 EER (13.4 EER2)~~ air conditioner.
* 3. High Performance Gas Furnace (Option 1) - Greater than or equal to 92% AFUE natural gas furnace.
* 4.~~8~~.High Performance Gas Furnace (Option 2) - Greater than or equal to 9~~6~~5% AFUE natural gas.
* 5.~~4.~~High Performance Gas Furnace and Cooling (Option 1) - Greater than or equal to 95% AFUE natural gas furnace and ~~15.2~~16.0 SEER2 air conditioner.
* 6.~~5.~~High Performance Gas Furnace and Cooling (Option 2) - Greater than or equal to 9~~5~~2% AFUE natural gas furnace and ~~16.0~~16.9 SEER2 air conditioner.
* 7.~~6.~~High Performance Gas Furnace and HP (Option 1) - Greater than or equal to 95% AFUE natural gas furnace and 8.~~5~~1 HSPF2/16.0 SEER2 air source heat pump.
* 8.~~7.~~High Performance Gas Furnace and HP (Option 2) - Greater than or equal to 95% AFUE natural gas furnace and 8.5 HSPF2/16.9 SEER2 air source heat pump.
* 9. High Performance HP (Option 1) - Greater than or equal to 8.​​​​~~5~~1 HSPF2/16.0 SEER2 air source heat pump.
* 10. High Performance HP (Option 2) - Greater than or equal to ~~9~~8.5 ~~HSPF (7.6~~ HSPF2~~)~~/16.9 ~~SEER (15.2~~ SEER2~~)~~ air source heat pump.
* ~~10. Greater than or equal to 10 HSPF (8.5 HSPF2) / 16 SEER (15.2 SEER2) air source heat pump.~~
* 11.Ground Source HP - Greater than or equal to 3.5 COP ground source heat pump.

~~Ductless Systems:~~

~~12 Single Zone: 8.5 HSPF2/16.9 SEER2 variable speed air source heat pump.~~

~~13. Multi-Zone: 8.5 HSPF2/16.9 SEER2 variable speed air source heat pump (Non-Ducted Indoor Units).~~

~~14. Multi-Zone: 8.5 HSPF2/15.2 SEER2 variable speed air source heat pump (Ducted or Mixed Indoor Units).~~

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 |
| R408.2.2(1) | High performance cooling ~~system~~ option 1 | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~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~~~~0~~TBD | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~TBD | ~~TBD~~~~0~~TBD |
| R408.2.2(~~8~~4) | High performance gas furnace option 2 | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| R408.2.2(~~4~~5) | High performance gas furnace and cooling option 1 | ~~0~~TBD | ~~0~~TBD | ~~0~~TBD | ~~0~~TBD | TBD~~0~~ | TBD | TBD | TBD | TBD~~0~~ |
| R408.2.2(~~5~~6) | High performance gas furnace and cooling ~~system~~ option 2 | TBD | TBD | TBD | TBD | ~~0~~TBD | ~~0~~TBD | ~~0~~TBD | ~~0~~TBD | ~~0~~TBD |
| R408.2.2(~~6~~7) | High performance gas furnace and ~~heat pump~~ HP ~~system~~ option 1 | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| R408.2.2.(~~7~~8) | High performance gas furnace and ~~heat pump~~ HP option 2 | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| R408.2.2.(~~8~~9) | High performance ~~heat pump~~ HP ~~system~~ option 1 | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| R408.2.2(~~9~~10) | High performance ~~heat pump~~ HP ~~system~~ option 2 | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD | TBD |
| ~~R408.2.2(10)~~ | ~~High per4formance heat pump system option 3~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ | ~~TBD~~ |
| R408.2.2(11) | Ground source ~~heat pump~~ HP | 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 – Miltizone (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~~ |

**Reason:**

This amended proposal is based on industry discussions over the last several months.

The added statement in the body of R408.2.2 is to address how to apply credits when multiple heating and/or cooling systems are used in a building (example – centrally ducted HP in most of the house and a mini-split HP in new addition). Credits would be applied based on the percentage of the building square footage of conditioned space that each system serves. This is consensus language agreed to by AHRI members and CA IOUs during joint discussions.

The Gas Furnace Option 2 was moved from #8 to #4 in the table and listing as it is more appropriately located directly adjacent to the Gas Furnace Option 1. Other measures were renumbered accordingly.

The measure names have been modified in R408.2.2 listing of measures to make it easier to align the credits in the Table R408.2 with the requirements for the measure under section R408.2.2.

The values in the table are either (1) “0” where no credit is provided or (2) “TBD” where PNNL will identify appropriate credits for each measure in each CZ. It is distinctly possible that some of the measures may not result in energy savings and corresponding energy credits, but the PNNL analysis should direct these values.

The underline and ~~strikeout~~ in this modified proposal are based on RED1-344-22 as printed in the IECC-R-PDC1 Monograph.

**Cost Impact:**

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

The code will enable more architects, builders and consumers to use energy efficient products and gain energy credits associated with the product selected and the climate zone that the building is located.

RECD1-9-22 Modification

**Proponent:** Kyle Bergeron (kbergeron@ahrinet.org) AHRI

**2024 International Energy Conservation Code**

**SECTION R202**

**GENERAL DEFINITIONS**

**Add text as follows:**

Thermal Energy Storage Heating System: A non-portable heating system, with a nameplate capacity of not less than 5 kWh, that adds heat to a storage medium which is subsequently used to provide energy for the heating of the interior of a building. The heat storage medium consists of a phase change or solid storage material.

**SECTION R403**

**ADDITIONAL EFFICIENCY REQUIREMENTS**

R403.7 Equipment sizing and efficiency rating. Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies. New or replacement heating and cooling equipment shall have an efficiency rating equal to or greater than the minimum required by federal law for the geographic location where the equipment is installed.

Revise as follows:

R403.7.1 Electric-resistance space heating. Detached one- and two-family dwellings and townhouses in Climate Zones 4 through 8 using electric -resistance space heating shall limit the total installed heating capacity of all electric-resistance space heating serving the dwelling unit to no more than 2 kW, or shall install a heat pump in the largest space that is not used as a bedroom.

Exception:

1. This limit does not apply to *thermal energy storage heating systems.*

**Reason:** The definition of thermal energy storage is aligned with the US tax code for incentives through investment tax credits (26 U.S. Code § 48). These definitions are necessary to ensure that code compliance paths include thermal storage technology, which has been identified as a national priority by Congress. The minimum size of 5kW ensures that the system will keep home energy use off peak, which is the primary purpose and function of the devices.

**Cost Impact:** Will not increase the cost of construction.

This proposal adds no substantive requirements and, thus, does not add to the cost of construction.