**RED1-320-22**

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**Note: This is a proposed modification for consideration by the IECC-R HVACR Subcommittee. Changes to the original proposal are shown in red font.**

# 2024 ENERGY Chapter11

**Add new definition as follows:**

**ENTHALPY RECOVERY RATIO.** Change in the enthalpy of the outdoor air supply divided by the difference between the outdoor air and entering exhaust air enthalpy, expressed as a percentage.

**Net Moisture Transfer:**

**Revise as follows:**

**N1103.6.1 Heat or energy recovery ventilation.** Heat or energy recovery ventilation systems shall be provided as specified in either Section

N1103.6.1.1 or N1103.6.1.2, as applicable.

**Add new text as follows:**

**N1103.6.1.1 Group R-2 occupancy *dwelling units* ~~adjoining a corridor~~ .** Within buildings of Group R-2 occupancy, *dwelling units* ~~adjoining a corridor~~ shall be provided with a balanced ventilation system having an *enthalpy recovery ratio* of not less than 50 percent at cooling design condition and not less than 60 percent at heating design condition.

Exceptions:

1. Dwelling units in Climate Zone 3C.
2. Dwelling units with not more than 500 square feet (46 m) of conditioned floor area that are located in Climate Zones 0, 1, 2, 3, 4C, or 5C and either adjoin an open-ended corridor or do not adjoin a corridor.
3. Dwelling units with not more than 500 square feet (46 m2 ) of conditioned floor area that are located in Climate Zones 1A, 2B, 3B, or 3C.
4. Enthalpy recovery ratio requirements at heating design condition in Climate Zones 0, 1, and 2.
5. Enthalpy recovery ratio requirements at cooling design condition in Climate Zones 4, 5, 6, 7, and 8.
6. Balanced ventilation systems meeting each of the following requirements:
   1. Having a listed sensible recovery efficiency (SRE) determined in accordance with CSA C439 that is not less than 65 percent at 32 °F (0 °C), at an airflow not less than the design airflow. The SRE shall be determined from a listed value or from interpolation of listed values.
   2. In climate zones 0A, 1A, 2A, and 3A, having a listed net moisture transfer determined in accordance with CSA C439 that is not less than 40 percent at 95 °F (35°C), at an airflow not less than the design airflow. The net moisture transfer shall be determined from a listed value or from interpolation of listed values.

**N1103.6.1.2 All other *dwelling units*.** All other *d~~D~~welling units* shall be provided with a heat recovery or energy recovery ventilation system in Climate Zones 6, 7, and 8. The system shall be a balanced ventilation system with a sensible recovery efficiency (SRE) determined in accordance with CSA C439 that is ~~of~~ not less than 65 percent at 32°F (0°C), at an airflow ~~greater than or equal to~~ not less than the design airflow. The SRE shall be determined from a listed value or from interpolation of listed values.

**N1103.6.2 Whole-dwelling mechanical ventilation system fan efficacy.** Fans used to provide whole-dwelling mechanical ventilation shall meet the efficacy requirements of Table N1103.6.2 at one or more rating points. Fans shall be tested in accordance with the test procedure referenced by Table N1103.6.2 and listed. The airflow shall be reported in the product listing or on the label. Fan efficacy shall be reported in the product listing or shall be derived from the input power and airflow values reported in the product listing or on the label. Fan efficacy for fully ducted HRV, ERV, balanced and in-line fans shall be determined at a static pressure of not less than 0.2 inch water column (49.82 Pa). Fan efficacy for ducted range hoods, bathroom, and utility room fans shall be determined at a static pressure of not less than 0.1 inch water column (24.91 Pa).

# 2024 International Energy Conservation Code [RE Project]

**Add new definition as follows:**

**ENTHALPY RECOVERY RATIO.** Change in the enthalpy of the outdoor air supply divided by the difference between the outdoor air and entering exhaust air enthalpy, expressed as a percentage.

**Revise as follows:**

**R403.6.1 Heat or energy recovery ventilation.** Heat or energy recovery ventilation systems shall be provided as specified in either Section R403.6.1.1 or R403.6.1.2, as applicable.

**Add new text as follows:**

**R403.6.1.1 Group R-2 occupancy dwelling units ~~adjoining a corridor~~.** Within buildings of Group R-2 occupancy, dwelling units ~~adjoining a corridor~~ shall be provided with a balanced ventilation system having an enthalpy recovery ratio of not less than 50 percent at cooling design condition and not less than 60 percent at heating design condition.

**Exceptions:**

1. Dwelling units in Climate Zone 3C.
2. Dwelling units with not more than 500 square feet (46 m) of conditioned floor area that are located in Climate Zones 0, 1, 2, 3, 4C, or 5C and either adjoin an open-ended corridor or do not adjoin a corridor.
3. Dwelling units with not more than 500 square feet (46 m2 ) of conditioned floor area that are located in Climate Zones 1A, 2B, 3B, or 3C.
4. Enthalpy recovery ratio requirements at heating design condition in Climate Zones 0, 1, and 2.
5. Enthalpy recovery ratio requirements at cooling design condition in Climate Zones 4, 5, 6, 7, and 8.
6. Balanced ventilation systems meeting each of the following requirements:
   1. Having a listed sensible recovery efficiency (SRE) determined in accordance with CSA C439 that is not less than 65 percent at 32 °F (0 °C), at an airflow not less than the design airflow. The SRE shall be determined from a listed value or from interpolation of listed values.
   2. In climate zones 0A, 1A, 2A, and 3A, having a listed net moisture transfer determined in accordance with CSA C439 that is not less than 40 percent at 95 °F (35°C), at an airflow not less than the design airflow. The net moisture transfer shall be determined from a listed value or from interpolation of listed values.

**R403.6.1.2 All other *dwelling units*.** All other *d~~D~~welling units* shall be provided with a heat recovery or energy recovery ventilation system in Climate Zones 6, 7, and 8. The system shall be a balanced ventilation system with a sensible recovery efficiency (SRE) determined in accordance with CSA C439 that is ~~of~~ not less than 65 percent at 32°F (0°C), at an airflow ~~greater than or equal to~~ not less than the design airflow. The SRE shall be determined from a listed value or from interpolation of listed values.

**Reason:** This proposal establishes a requirement for a balanced ventilation system with heat recovery (i.e., an HRV or an ERV) for low-rise dwelling units that adjoin a corridor in Group R-2 buildings based on a cost effectiveness analysis. The requirement aligns with the text approved by the IECC-C Consensus Committee and contained within the 2024 IECC PC#1 draft, Section C403.7.4.1.

**Cost Impact:** The code change proposal will increase the cost of construction.

This proposal imports the 2021 IECC-C H/ERV requirements for R-2 dwelling units from Section C403.7.4.1 and expands them to match the 2024 PC#1 IECC-C H/ERV requirements for R-2 dwelling units. Cost effectiveness documentation supporting the existing 2021 IECC-C requirements for H/ERVs in R-2 dwelling units were submitted in that code cycle and were also submitted through ASHRAE 90.1 as the basis for establishing identical requirements in that standard. The assumptions used to characterize typical R-2 dwelling units in the 2021 IECC-C cost effectiveness study are also applicable to 2024 IECC-R R-2 dwelling units (at least in terms of the effects on ventilation energy use and savings), and so the cost effectiveness study does not need to be repeated to justify transitioning the requirements to the IECC-R. Stakeholders may refer to the cost effectiveness documentation submitted with the 2021 IECC-C code change for more information.

The cost effectiveness study submitted for this proposal supports the expansion of R-2 dwelling unit H/ERV requirements beyond those already established by the 2021 IECC-C, to align with the 2024 PC#1 IECC-C H/ERV requirements for R-2 dwelling units. The cost effectiveness analysis justifying this proposal was based on the method approved by the Residential Consensus Committee, using their cost effectiveness calculator, accessed through the following link in December, 2022. Details are provided in an Excel workbook that can be found through the following link:

https://www.dropbox.com/scl/fi/or5nrv3aqldm5jmdpqom2/HERV-R-2-Cost-Effectiveness-Final-20221216.xlsm? dl=0&rlkey=oax6xdr4w97cpwlyahie4d1jm.

**Reason for modification to original proposal**: Large, central H/ERVs serving multiple dwelling units are typically certified for performance based on testing conducted in accordance with AHRI 1060. The relevant sensible and latent energy transfer metric for such units is the “enthalpy recovery ratio.” Smaller, in-suite H/ERVs generally serving individual dwelling units are typically certified for performance based on testing conducted in accordance with CSA C439. The relevant energy transfer metrics for such units are the sensible recovery efficiency (SRE) for sensible energy and the net moisture transfer for latent energy. Exception 6 to R403.6.1.1 (N1103.6.1.1) would facilitate the use of commonly specified H/ERVs for dwelling units (i.e., those tested in accordance with CSA C439), that are expected to achieve comparable in-situ performance. The target SRE aligns with that currently required in Section N1103.6.1 (R403.6.1) for dwelling units in Climate Zones 7 and 8. The target net moisture transfer metric would only be required for hot/humid climate zones to support IAQ, where moderation of outdoor moisture levels is especially important for managing indoor humidity. The value of 40% is achievable by most models while providing a significant reduction in latent loads associated with introducing outdoor air.