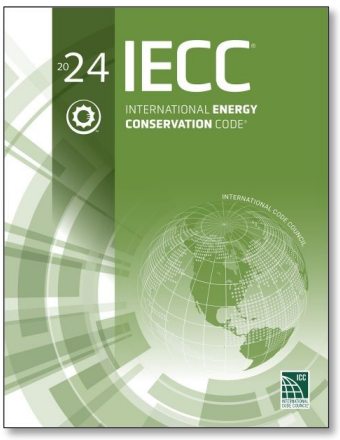
2024 IECC Commercial Energy Code Section C406

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Efficiency Programs

In 2024, Rhode Island passed a law requiring the prompt adoption of the 2024 International Energy Conservation Code (IECC), which includes more stringent requirements for commercial buildings. Highlighted here is Section C406 – Additional Efficiency, Renewable and Load Management Requirements.



Understanding the New C406 Requirements

In Section C406, the 2024 IECC introduces a new, more complex approach to the section on additional requirements, requiring projects to select a combination of above-base code provisions to meet a minimum credit (points) requirement in both of the following categories depending on size:

C406.1.1 Additional energy efficiency credit requirements, for projects >2,000 square feet

C406.1.2 Additional renewable and load management credit requirements, >5,000 sq. ft.

All additional measures must be considered after complying with the more typical prescriptive code requirements--you can't use the other prescriptive requirements to satisfy these "additional" requirements. All new commercial projects with over 2,000 square feet of conditioned area must meet the additional energy efficiency credit requirements. All new commercial projects with over 5,000 square feet of conditioned area must meet both the additional energy efficiency credit requirements as well as the additional renewable and load management credit requirements.

Depending on project size, one or both credit categories apply. The number of credit points required for each credit category are listed by Occupancy Group and Climate Zone. All of Rhode Island is designated as Climate Zone 5A in the code. Therefore, the number of credit points required depends on its Occupancy Group.

C406.1.1 Additional Energy Efficiency Credit Requirements

The total points required for Rhode Island, Climate Zone 5A, will vary by Occupancy Group and are listed in Table C406.1.1(1). For example, in Rhode Island, 71 Additional Energy Efficiency Credit points are required for Occupancy Group B. To earn points in this category, project teams choose from various measures detailed in Section C406 to reach the Credit point total required (e.g., 71 for Group B).

> *Section C406.1.1 Exception 2 requires projects with multiple occupancy groups to use a weighted (or pro-rated) credit total requirement. This is based on the listed requirement for the gross conditioned floor area of each Occupancy Group. Equation 4-12 is then used to calculate the area weighted total for the project. This equation also factors in whether the project is all-electric.*

The available credits for each Occupancy Group are then listed in a series of Tables numbered C406.2(1) through C406.2(9), and include:

- 6 different Envelope measures
- 5 HVAC measures (one of which is for residential projects only)
- 10 domestic hot water measures
- 1 Energy Monitoring measure
- 6 Lighting measures (one for residential projects only)
- 4 miscellaneous measures, including Fault Detection (if not already required)

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HVAC Credit Example

- For a 5,500 conditioned square foot project, a typical project today will use small VRF fan coil units in each zone and DOAS units to provide required mechanical ventilation
- For heat pumps, the equipment can earn points under both H02 for heating efficiency & H03 for cooling efficiency improvements of 5% or more beyond code
- H02 for heating efficiency
  - For Group B occupancies, use Table C406.2(4) and enter the column for Climate Zone 5A to get the value of 5 to use in the H02 credit calculation formula in C406.2.2.2
  - Then calculate the capacity-weighted efficiency for all relevant project equipment, say this is 8% better than code minimum efficiencies listed in the Tables in C403.3.2
  - Then Equation 4-16 gives us EECH5 * (HEI/0.05) = 5 * (0.08/0.05) = 8
- H03 for cooling efficiency
  - For Group B occupancies, use Table C406.2(4) and enter the column for Climate Zone 5A to get the value of 1 to use in the H03 credit calculation formula in C406.2.2.2
  - The calculated capacity-weighted average efficiency improvement is, for this example, 5%
  - Then Equation 4-16 gives us EECH5 * (HEI/0.05) = 1 * (0.06/0.05) = 1
- H05 for DOAS
  - Verify that all zone VRF units are NOT required to have multispeed fan control
  - Verify that, when satisfied, the minimum local indoor fan is Off or low enough so that fan energy is no more than 0.12 watts per cfm
  - Verify that no individual DOAS zone receives more than 130% of the IMC-required ventilation air
  - Verify that DOAS units are equipped with sensible and latent ("total") energy recovery
  - Verify that either economizer bypass ducts and dampers are included, or a DOAS supply air temperature reset of at least 5°F is sequenced
  - For Group B occupancies, use Table C406.2(4) and enter the column for Climate Zone 5A to get the value of 47 to use in the H02 credit calculation formula in C406.2.2.2
  - Then calculate the capacity-weighted enthalpy efficiency rating for heating for all relevant project equipment, say 68%
  - Then use Table C406.2.2.5 to reduce the points earned if the capacity-weighted enthalpy efficiency rating for either cooling or heating is less than 65% - in our case this factor is 1
  - Finally, Equation 4-18 results in 47 energy credits for DOAS.

C406.1.2 Additional Renewable and Load Management Credit Requirements

This section uses a similar approach to require a user-selected combination of renewable and load management credits. The total Credit points required are listed by Climate Zone and Occupancy Group. To earn the required points, users choose measures from Section C406.3.

C406.3 Renewable and load management credits include:

- Renewable Energy
- Building thermal mass
- Domestic service hot water energy storage
- Electric energy storage
- Cooling energy storage
- Dynamic glazing or automated shading/motorized shades
- Utility load management response for lighting and/or HVAC, or ventilation shift

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The points required vary by Occupancy Group and Climate Zone (all of RI is Climate Zone 5A). For example, in Rhode Island, 38 points are required for Occupancy Group B. (A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy.) Up to 19 of the 71 required energy points for Occupancy Group B in RI may be earned as renewable and load management points.

Earning the lighting, HVAC, or automated shading load management control credits requires interfacing with the utility's load management program apply to. A simpler local-only programmed approach is allowed only on projects under 25,000 gross square feet, or where a demand response signal is not available from the local electric utility company.

It's important to note that Load Management points are all covered by very strict requirements for implementation. However, an exception exists for projects under 25,000 gross square feet, which can use a scheduled load shed set to coincide with utility peaks.

> *Per the Exception to C406.1.2, excess Energy Efficiency Credit points achieved above the required minimum can be applied without limit to the Additional Renewable and Load Management Credit requirement.*
>
> *Per the Exceptions to C406.1.1, excess Renewable and Load Management Credit points earned above the required minimum may be applied to the Additional Energy Efficiency Credit requirement, up to a limit specified by Equation 4-12. This equation is used to modify the limits listed in Table C406.1.1(2) by Occupancy Group and Climate Zone (Rhode Island, Climate Zone 5A). The equation is intended to penalize buildings with fossil fuel equipment other than emergency generators by reducing the number of credits that can be carried over by 30%.*

Expert Insights

Stephen Turner, a building commissioning and energy efficiency consultant, shares his insights on how the code provisions appear to require heightened attention to energy code requirements by designers:

> "The new points-based system for additional efficiency, renewables, and load management represents a significant shift. The section is quite complex, but provides some flexibility in applying excess credits between the two categories. Successfully meeting C406 while managing first cost impacts requires consideration early in design, with deliberate selection of a combination of measures most appropriate for each project."

Resources and Tools

- Check out the 2024 I-Codes: codes.iccsafe.org/codes/i-codes/2024-icodes
- Free Energy Code Technical Support: 1-855-343-0105
- Energy efficiency incentives and rebates continue to be available for new construction and major renovation projects. Visit www.rienergy.com/RI-Business/Energy-Saving-Programs/New-Construction-Major-Renovations, or call 1-855-RIE-1108