

LEED BD+C: Multifamily Midrise | v4 - LEED v4

Minimum energy performance

Required

Intent

To improve the building's overall energy performance and reduce its greenhouse gas emissions.

Requirements

Meet both the whole-building energy simulation and commissioning requirements:

Whole-Building Energy Simulation

Demonstrate a 5% improvement over the baseline building performance rating. Calculate the baseline according to the building performance rating method of USGBC's residential midrise simulation guidelines, which is based on ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G (with errata), or USGBC-approved equivalent standard for projects outside the United States, using a computer simulation model for the whole-building project.

Comply with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010 (with errata).

Comply with USGBC's residential midrise simulation guidelines.

Include all energy consumption and energy costs associated with the building project.

Compare the design case with a baseline building that complies with Standard 90.1–2010, Appendix G (with errata but without addenda).

AND

Commissioning

Option 1. Commissioning using ENERGY STAR protocols. Meet the ENERGY STAR Qualified Multifamily High Rise Buildings Testing and Verification (T&V) Protocols.

OR

Option 2. Commissioning using Prescriptive Path.

Meet all of the following:

1. Reduced Heating and Cooling Distribution System Losses for In-unit HVAC

Limit the duct air leakage rate, testing for leakage to outside the unit or conducting a total duct leakage test. The tested leakage-to-outside rate must be less than 4.0 cfm₂₅ per 100 square feet (1.2 cmm at 25 Pascals per 100 square meters) of conditioned floor area for each installed system. For units smaller than 1,200 square feet (110 square meters) tested leakage must be less than 6.0 cfm₂₅ per 100 square feet (1.7 cmm at 25 Pascals per 100 square meters). Total duct leakage for in-unit systems must not exceed 8 cfm₂₅ per 100 square feet (2.4 cmm at 25 Pascals per 100 square meters) of conditioned floor area. Testing is waived if the air-handler unit and all ductwork are visibly within the unit's envelope (i.e., no ducts are hidden in walls, chases, floors, or ceilings).

2. Fundamental Commissioning of Central HVAC Systems

Meet the performance testing and ongoing maintenance requirements of EA Prerequisite Fundamental Commissioning and Verification of LEED v4 for New Construction for central commercial heating, cooling, water heating and ventilation systems. The requirements include the following:

- Develop a system test procedure.
- Verify system test execution.
- Maintain an issues and benefits log throughout the commissioning process.
- Document all findings and recommendations and report directly to the owner throughout the process.
- Prepare and maintain a current facilities requirements and operations and maintenance plan documenting information necessary for efficient building operations.

3. Construction Document Specifications

Include the following details in construction and bid documents:

- Elements to be sealed (construction and bid documents). List all elements identified in ASHRAE 90.1–2010, Section 5.4.3.1, or applicable state or local codes, in addition to any site-specific elements identified during plan review, and include the items in the LEED for Homes multifamily midrise thermal enclosure inspection checklist (see below). Show locations to be sealed as well as acceptable methods and materials.
- Air barrier sheet (bid documents). Show the air barrier continuity through the various conditions of the exterior enclosure; this information can serve as an index to details.
- Compartmentalization sheet (bid documents). Show the continuity of fire and smoke barriers around each apartment and between corridors, stairs, and common areas; this information can serve as an index to details.

4. LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist

Inspect and verify each item on the checklist. The LEED checklist is based on the ENERGY STAR for Homes, version 3

Certified Passive House projects automatically meet the thermal enclosure inspection checklist requirement.

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The following conditions (where applicable) must be met. Note that unless otherwise noted, CanQUEST (the Canadian energy modelling software based on eQUEST that performs NECB 2011 compliance runs) does not implement many of these conditions correctly and would require corresponding modifications to the Reference case.

1. Comply with mandatory requirements of ASHRAE 90.1-2010

ASHRAE 90.1-2010 mandatory requirements must be met, in addition to the performance path limitations referenced in the NECB 2011 Sections 3.4.1.2, 5.4.1.2 and 6.4.1.2. In cases where ASHRAE and the NECBC reference requirements concerning the same item, the more stringent requirement shall be adhered to.

The following exceptions apply:

- ASHRAE 90.1-2010 mandatory items 6.4.3.9, 9.4.1.2b, 9.4.1.4, 9.4.1.5, 9.4.3

2. Apply fenestration area convention similar to ASHRAE 90.1-2010

Maintain the same FWR (as defined by NECB, including doors) for the Reference as exists in the Proposed Design, up to the prescribed maximum. If the Proposed Design's FWR exceeds the prescribed FWR, scale down the fenestrations in the Reference case accordingly.

3. Apply skylight area convention similar to ASHRAE 90.1-2010

Maintain the same SRR for the Reference as exists in the Proposed Design, up to the prescribed 5% maximum. If the Proposed Design's SRR exceeds 5%, scale down the skylights in the Reference case accordingly.

4. Model proposed and reference outside air similar to ASHRAE 90.1-2010

Proposed and reference (baseline) outside air rates shall be modeled as per ASHRAE 90.1 – 2010 (G3.1.2.6).

5. Apply ASHRAE kitchen exhaust demand ventilation requirements

Provide for the same demand ventilation requirements as described in ASHRAE Appendix G3.1.1.d.

6. Apply ASHRAE's chiller heat recovery requirements

Provide for the same chiller heat recovery requirements as applies to ASHRAE.

7. Apply supply air temperature reset controlled based on warmest zone

Reset the minimum supply air temperature to satisfy the cooling requirements of the warmest zone, as stipulated in NECB Section 5.2.8.8. Note that this control setting is already corrected in CanQUEST for the Reference case.

8. Account for uninsulated structural penetrations if they exceed 2% of net wall area

The 2% allowance may be applied, but based on the net opaque wall area, not the entire building envelope area.

9. Follow ASHRAE/LEED rules for renovations to existing buildings

Model existing components consistent with ASHRAE and LEED provisions.

10. Account for all anticipated energy use in building

Fully account for all energy end-uses in the energy performance modelling.

11. DES Systems are to be modeled according to Option 1, Path 1 or Option 1, Path 2 as indicated in the LEED v4 Reference Guide

The following exceptions apply:

- Option 1, Path 1 - Do not apply ASHRAE 90.1-2010 requirements for purchased heating and cooling. Under this ACP, purchased heating and cooling (as applicable) are modeled as cost-neutral in the baseline and proposed case. Local rates for purchased heating (fossil fuel based) and cooling are used to establish the purchased heating and cooling costs. The energy model's scope accounts for only downstream equipment, plus purchased heating and cooling. NECB clause 8.4.3.6 does not apply for LEED projects.
- Model baseline systems in accordance with NECB requirements, with DX coils replaced with chilled water coils if purchased cooling is present and fossil-fired furnaces replaced with hot water coils if purchased heating is present.
- Option 1, Path 2: Do not apply ASHRAE 90.1-2010 requirements for baseline systems. Model baseline systems in accordance with NECB requirements for onsite generated equipment (i.e. assume building is not connected to a DES and the proposed building is modeled with a virtual plant according to LEED v4 Reference Guide requirements).

