



Energy and Atmosphere Prerequisite 1
LEED for Homes Multifamily Mid-rise v2008
Update to the EPA Testing and Verification Protocols Prerequisite

July 1, 2016

Option 1. Meet the EPA Multifamily High-Rise Testing and Verification protocols.

OR

Option 2. Meet all of the following:

- A. Reduced Heating and Cooling Distribution System Losses for in-unit HVAC. Limit duct air leakage rate to outside the envelope of the unit. The tested duct leakage rate must be ≤ 6.0 cfm 25 Pascals per 100 square feet of conditioned floor area served by each system, verified by a qualified energy rater. Testing is waived if the air-handler unit and all ductwork are visibly within the unit's envelope (i.e., no ductwork hidden in walls, chases, floors, or ceilings).
- B. Fundamental Commissioning of Central HVAC Systems. Meet the performance testing requirements of EA Prerequisite 1 of 2009 LEED for New Construction for central commercial heating, cooling, water heating and ventilation systems.
- C. The following commissioning process activities must be completed by the project team:
 1. Designate an individual as the commissioning authority (CxA) to lead, review and oversee the completion of the commissioning process activities for any central commercial heating, cooling, water heating and ventilation systems.
 - The CxA must have documented commissioning authority experience in at least 2 building projects.
 - The individual serving as the CxA must be independent of the project design and construction management, though the CxA may be an employee of any firm providing those services. The CxA may be a qualified employee or consultant of the owner.
 - The CxA must report results, findings and recommendations directly to the owner.
 - For projects smaller than 50,000 gross square feet, the CxA may be a qualified person on the design or construction team who has the required experience.
 2. The owner must document the owner's project requirements. The design team must develop the basis of design. The CxA must review these documents for clarity and completeness. The owner and design team must be responsible for updates to their respective documents.
 3. Develop and incorporate commissioning requirements into the construction documents.
 4. Develop and implement a commissioning plan.
 5. Verify the installation and performance of the systems to be commissioned.
 6. Complete a summary commissioning report.
- D. Construction Document Specifications. Include the following details in construction and bid documents:



1. Include a list of elements to be sealed in construction documents. This list should include all elements identified in ASHRAE 90.1-2007, Section 5.4.3.1, or applicable state codes, in addition to any site-specific elements identified during plan review, and must include the items in the LEED for Homes Multifamily Mid-Rise Thermal Enclosure Inspection checklist. Bid documents must include locations to be sealed as well as acceptable methods and materials.
 2. Include an air barrier sheet in the bid documents that shows the air barrier continuity through the various conditions of the exterior enclosure, and can serve as an index to relevant details.
 3. Include a "compartmentalization" sheet in the bid documents that shows the continuity of fire and smoke barriers around each apartment and between various areas (corridors, stairs, common areas), and can serve as an index to relevant details.
- E. LEED for Home Multifamily Mid-Rise Thermal Enclosure Inspection Checklist. Have a third party qualified energy rater verify each item is met from the checklist, which is taken from the ENERGY STAR Qualified Homes, Version 3 (Rev. 02) Thermal Enclosure Rater Checklist, sections 2, 3 and 5.
- F. Compartmentalization. Each unit must be compartmentalized, to prevent excessive leakage between units. Meet both of the following:
1. Weather-strip all exterior doors and operable windows in the residential units to minimize leakage from outdoors. Minimize uncontrolled pathways for ETS and other indoor air pollutant transfer between individual residential units by sealing penetrations in walls, ceilings and floors in the residential units and by sealing vertical chases (including utility chases, garbage chutes, mail drops, and elevator shafts) adjacent to the units. Weather-strip all doors in the residential units leading to common hallways to minimize air leakage into the hallway.
 2. Demonstrate acceptable sealing of residential units by a blower door test. Follow the procedure described in the ENERGY STAR Testing and Verification Protocols for multifamily high-rise buildings, with an allowable maximum leakage of 0.30 cfm50 per square foot of enclosure (i.e. all surfaces enclosing the apartment, including exterior and party walls, floors, ceiling).



LEED for Homes Multi-Family Mid-Rise Thermal Enclosure Inspection Checklist

Complete the Below Thermal Enclosure System Rater Checklist

This document is based off of the ENERGY STAR Qualified Homes, Version 3 (Rev. 03) Thermal Enclosure Rater Checklist. Project teams may elect to use that document, and complete sections 2.2, 3, and 5. Consult that document for further clarifications, including numerous footnotes that provide details and alternative compliance paths.

Inspection Guidelines		Must Correct	Builder Verified	Rater Verified	N/A
2. Quality-Installed Insulation					
2.2	All ceiling, wall, floor, and slab insulation shall achieve RESNET-defined Grade I installation or, alternatively, Grade II for surfaces with insulated sheathing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fully-Aligned Air Barriers					
At each insulated location noted below, a complete air barrier shall be provided that is fully aligned with the insulation as follows:					
3.1	Walls				
	3.1.1 Walls behind showers and tubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.2 Walls behind fireplaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.3 Attic knee walls / Sloped attics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.4 Skylight shaft walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.5 Wall adjoining porch roof	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.6 Staircase walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.7 Double walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.8 Garage rim / band joist adjoining conditioned space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.9 All other exterior walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	Floors				
	3.2.1 Floor above garage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2.2 Cantilevered floor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2.3 Floor above unconditioned basement or vented crawlspace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	Ceilings				
	3.3.1 Dropped ceiling/soffit below unconditioned attic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.3.2 Sloped ceilings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.3.3 All other ceilings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Air Sealing					
5.1	Penetrations to unconditioned space or that penetrate the residential unit envelope fully sealed with solid blocking or flashing as needed and gaps sealed with caulk or foam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.1 Duct / flue shaft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.2 Plumbing / piping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.3 Electrical wiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.4 Bathroom and kitchen exhaust fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.5 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and fully gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to > R-10 in CZ 4 and higher to minimize condensation potential.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.1.6 Light tubes adjacent to unconditioned space include lens separating unconditioned and conditioned space and are fully gasketed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



		Must Correct	Builder Verified	Rater Verified	N/A	
5.2	Cracks in the building envelope fully sealed					
	5.2.1	All sill plates adjacent to conditioned space sealed to foundation or sub-floor with caulk. Foam gasket also placed beneath sill plate if resting atop concrete or masonry and adjacent to conditioned space.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.2	At top of walls adjoining unconditioned spaces, continuous top plates or sealed blocking using caulk, foam, or equivalent material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.3	Sheetrock sealed to top plate at all attic/wall interfaces using caulk, foam, or equivalent material. Either apply sealant directly between sheetrock and top plate or to the seam between the two from the attic above. Construction adhesive shall not be used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.4	Rough opening around windows & exterior doors sealed with caulk or foam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.5	Marriage joints between modular home modules at all exterior boundary conditions fully sealed with gasket and foam	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.6	All seams between Structural Insulated Panels (SIPs) foamed and/or taped per manufacturer's instructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2.7	The gap between the drywall shaft wall (i.e. common wall) and the structural framing between units fully sealed at all exterior boundary conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3	Other Openings					
	5.3.1	Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions gasketed or made substantially air-tight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.3.2	Attic access panels and drop-down stairs equipped with a durable >R-10 insulated cover that is gasketed (i.e., not caulked) to produce continuous air seal when occupant is not accessing the attic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.3.3	Whole-house fans equipped with a durable >R-10 insulated cover that is gasketed and either installed on the house side or mechanically operated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>