ENERGY STAR Multifamily New Construction Revision 05

January 28, 2025

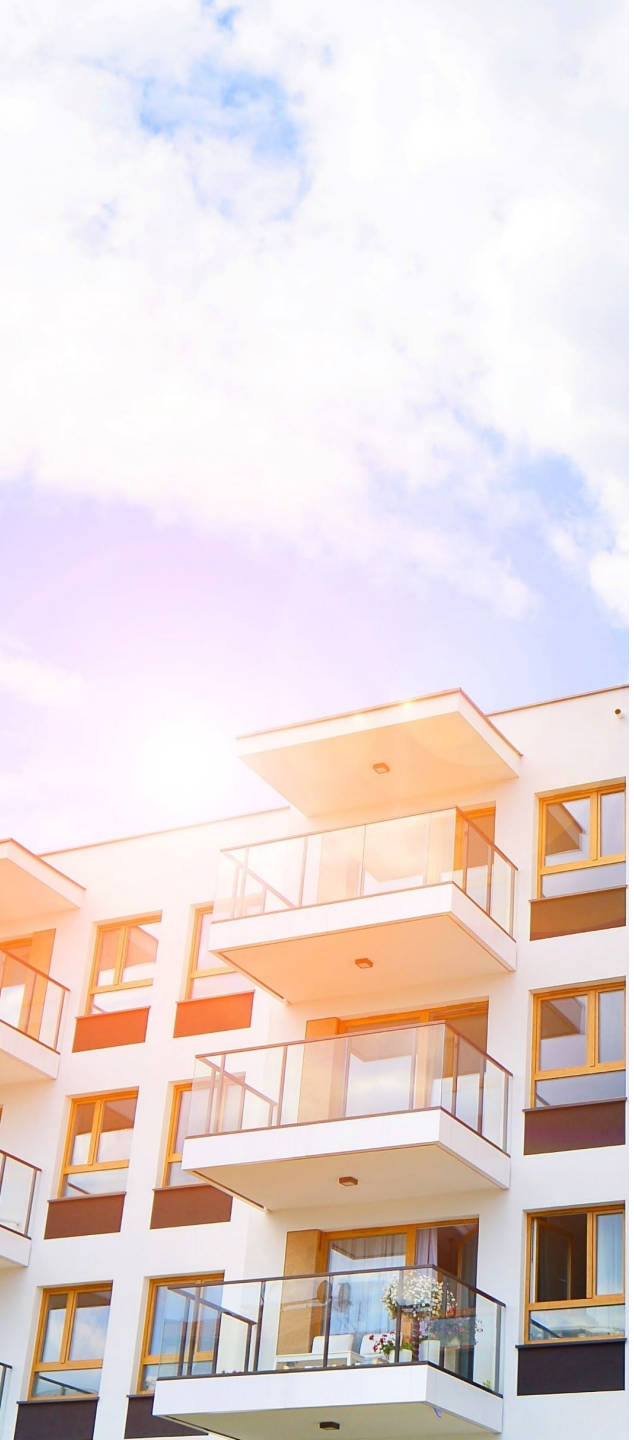
United States Environmental Protection Agency

Poll

- Who attended yesterday's "Year Ahead" presentation (featuring SFNH Revision 14)?

Poll

- How familiar are you with ENERGY STAR MFNC?
  - A. I am not familiar.
  - B. I've worked with SFNH, but not MFNC.
  - C. I have a basic understanding of MFNC.
  - D. I'm already working on buildings pursuing MFNC certification.



Agenda

1. Goals of Revision 05
2. Ten big changes (and one big thing that did not change)
3. Smaller changes and clarifications
    1. Reorganization
    2. Other clarifications and refinements
4. Questions

What is a Revision?

1. It clarifies
2. It simplifies
3. It improves

Primary goals for Revision 05

a) Enhance quality assurance and quality control:
   - By reducing the number of requirements that are not Rater-verified; and
   - Standardizing documentation

b) Reduce program complexity by creating more linear certification process, with fewer decision points.

c) Simplify program by exchanging several lower-impact mandatory measures for performance-based approaches.

Overview

- Themes:
  - Rev. 03 – “Clarifications are Key”
  - Rev. 04 – “Clarify some More”
  - Rev. 05 – “Reduce and Reorganize”

Ten big changes (and one non-change)

#1 of 10. **Limit townhouse eligibility to Single-Family New Homes**

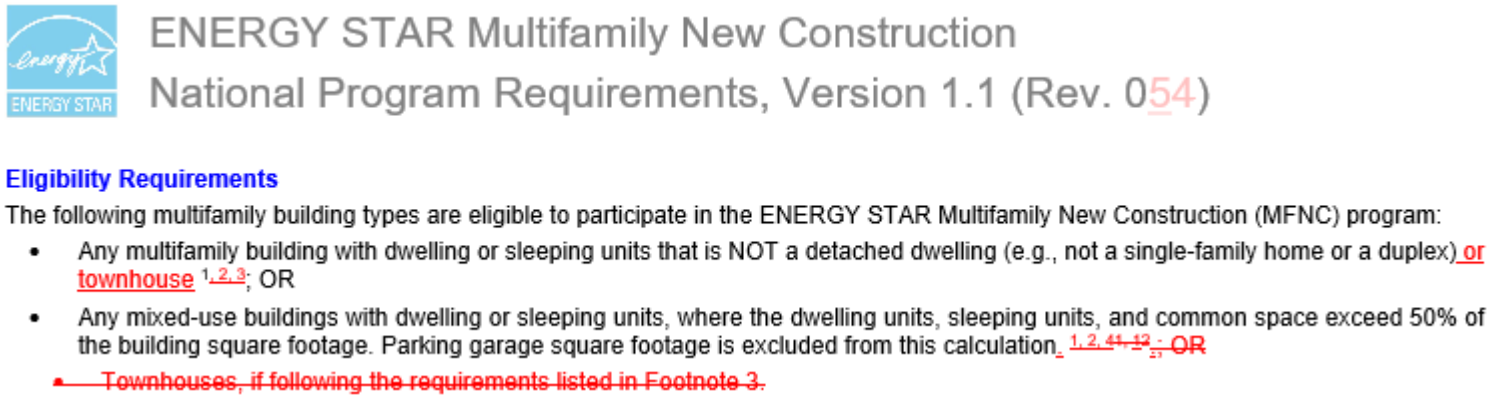
Background

- Prior to Rev. 05, townhouses could be certified through either the Single-Family New Homes (SFNH) program or through the Multifamily New Construction program (MFNC).
- However, even when using MFNC, townhouses could only use the ERI Path and the SFNH reference design, and had to meet townhouse-specific mandatory measures.

A 'townhouse', as defined by ANSI / RESNET / ICC 301, is a single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to roof and with open space on at least two sides.

Overview of change

- Updated eligibility so that townhouses are no longer eligible for MFNC, and can only be certified through SFNH.
- Removed all townhouse-specific requirements and notes from program documents.



ENERGY STAR Multifamily New Construction
National Program Requirements, Version 1.1 (Rev. 054)

Eligibility Requirements

The following multifamily building types are eligible to participate in the ENERGY STAR Multifamily New Construction (MFNC) program:

- Any multifamily building with dwelling or sleeping units that is NOT a detached dwelling (e.g., not a single-family home or a duplex) or townhouse [1,2,3]; OR
- Any mixed-use buildings with dwelling or sleeping units, where the dwelling units, sleeping units, and common space exceed 50% of the building square footage. Parking garage square footage is excluded from this calculation. [1,2,4] [1,2] ; OR
- ~~Townhouses, if following the requirements listed in Footnote 3.~~

#2 of 10. Program Requirements: **Require Multifamily Workbook for all paths**

Background

- The Multifamily Workbook is an Excel document that contains:
  - Rater Design Review and Rater Field Checklists in Excel format
  - Building efficiency features and testing results
- Prior to Rev. 05, the Multifamily Workbook was required for ASHRAE and Prescriptive Paths, and optional for ERI Path.
- There was no standard template for documenting common spaces or building UA calculations for the ERI Path, causing challenges for Raters and HCOs.

Overview of change

- The Multifamily Workbook is required for all buildings pursuing certification, regardless of path.
- A new tab includes specific instructions for the ERI Path to determine which tabs are required.

Overview of change

ERI Instructions Tab

Complete the following questions to determine which tabs are required for the building	
1. Building Envelope	
Do any dwelling units not meet the ENERGY STAR UA (or TC) requirements in ERI software?	No
Do any dwelling units not meet the ENERGY STAR SHGC requirements in ERI software?	No
Does the building have any concrete floors?	Yes
2. Common Spaces	
Does the building have any common spaces, including mechanical closets, etc. that may not be occupiable spaces?	Yes
Do any common spaces have heating or cooling systems?	Yes
Do any common spaces have dishwashers or refrigerators?	No
Are any common spaces served by hot water (except for shared laundry)?	Yes
3. Central Exhaust	
Are there any central exhaust systems? (Any exhaust system serving 4 or more dwelling units, including HRV/ERVs?)	Yes
4. Parking, does the building have any of the following?	
a. Parking lot	Yes
b. Heated individual garage	No
c. Heated shared garage	No
d. Heated plenum in unconditioned space or ambient conditions or garage	No
e. Unheated shared garage	No
f. Cooled garage (individual or shared)	No
g. Appliances in a garage	No

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Overview of change

ERI Instructions Tab

Tabs to complete	
Tab Name	Complete Status
Building Information	Must Complete
Rater Design Checklist	Complete in Workbook or PDF
Rater Field Checklist	Complete in Workbook or PDF
Unit Testing Results	Optional
Common Area Ventilation	Fill out questions
Central Exhaust Duct Test	Fill out questions
Appliances	Fill out questions
Total UA Compliance	Fill out questions
Heated Plenum or Garage	Fill out questions
DHW/SHW Schedule	Fill out questions
Heating and Cooling Schedule	Fill out questions
Lighting	Fill out questions

Overview of change

ERI Instructions Tab

Tabs to complete	
Tab Name	Complete Status
Building Information	Must Complete
Rater Design Checklist	Complete in Workbook or PDF
Rater Field Checklist	Complete in Workbook or PDF
Unit Testing Results	Optional
Common Area Ventilation	Must Complete
Central Exhaust Duct Test	Must Complete
Appliances	Optional
Total UA Compliance	Must Complete
Heated Plenum or Garage	Optional
DHW/SHW Schedule	Must Complete
Heating and Cooling Schedule	Must Complete
Lighting	Must Complete

Overview of change

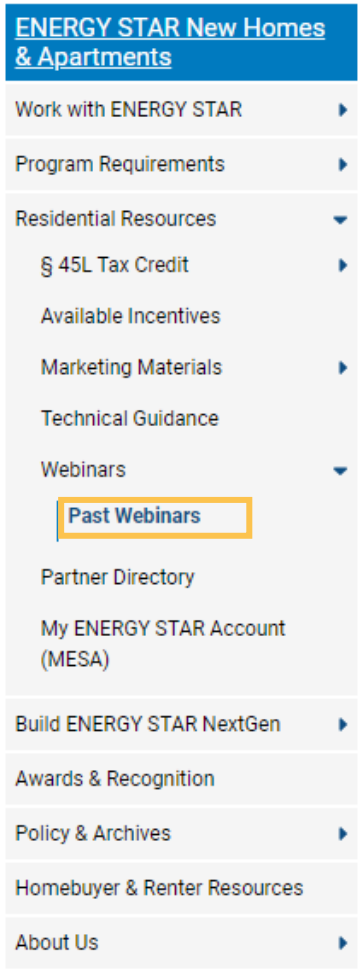
Unit Testing Results

Instructions:
This tab is required for the ASHRAE and Prescriptive Paths only; it is not required for ERI Path.
For the optional design review, complete yellow cells in the "Unit Types" table for the unique floorplans in the project. Completing orange cells in the "Unit" and "Unit ID" column of the "Unit Details" table is recommended.
Prior to testing, each unit in the project should be reported and assigned a unit type in the "Unit Details" table. These two tables will enable the generation of the testing targets and allow the user to track testing results of all items on an individual apartment basis.
Update the dropdown in cell M14 to select the ASHRAE 62.2 Ventilation Rate for your project (2010 or 2013/2016).
For final certification or as testing is completed, enter test values into all orange cells in the Testing Results section. Pass/Fail values will display at the unit level and for the entire checklist item.
Additionally, prior to As-Built submittal, complete the orange cells in the "Label Printing Data Entry" table.
Printing: Optimized for Landscape view

Central Exhaust Duct Test

Instructions:
This tab is required for all paths, where central exhaust or central ERV/HRV systems (serving 4 or more units) are present.
For the optional design review, complete yellow cells.
For final certification, complete yellow and orange cells.
In the Summary section, enter a description of your sampling plan and the total number of fans & risers.Tables below can be expanded using the + button; copy and insert rows as needed. CFM allowances will calculate automatically.
For central exhaust system duct leakage test requirements and testing options, please refer to Item 6.7 of Rater Field Checklist. Complete the applicable tables for the testing option selected.
Show Rater Field Checklist Item 6.7
Printing: Optimized for printing in Landscape view.

Multifamily Workbook Recorded Tutorial



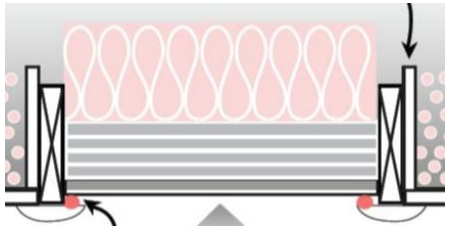
ENERGY STAR MFNC Multifamily Workbook Tutorial (PDF, 529 KB) (7/22/2024)

This webinar is geared toward ENERGY STAR stakeholders that have already attended our prior introductory-level webinars about the ENERGY STAR Multifamily New Construction (MFNC) program and are familiar with the overall certification process and program requirements. This webinar provides a guided tour of the Multifamily Workbook with ZERH Addenda. Topics include the benefits of the Excel versions of the Rater Design Checklist and Rater Field Checklist, automated calculations of the Dwelling Unit testing targets, reporting template for sampled testing results, automated envelope and fenestration compliance checks, and demonstrating how color-coded fields show what is required for ASHRAE and Prescriptive projects at Proposed Design and As-Built Submittals. Stakeholders will also receive a brief introduction to the "ZERH Addenda" tabs, which can be used to demonstrate compliance with the DOE Zero Energy Ready Home program's Multifamily specifications. The webinar can be viewed on YouTube at: ENERGY STAR Multifamily New Construction Workbook Tutorial.

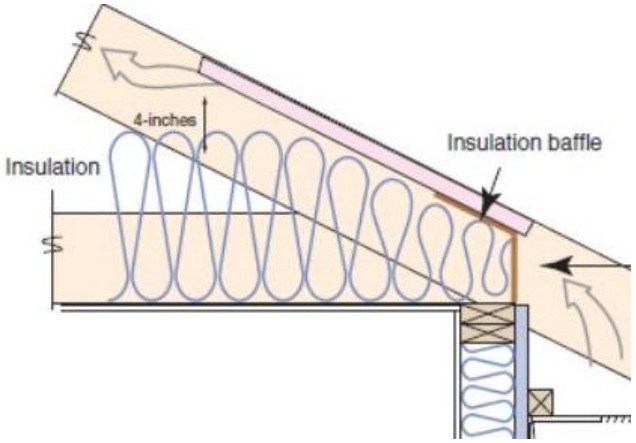
#3 of 10. National Rater Field Checklist: **Eliminated some mandatory reduced thermal bridging requirements**

Background

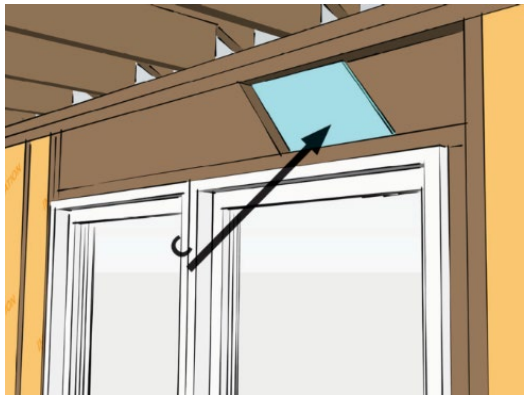
- Prior to Rev. 05, buildings were required to include several mandatory details that reduce thermal bridging, unless it qualified for one or more exemptions.
- These encompassed the attic edge, attic platforms and hatches, above-grade walls, and slab edges.



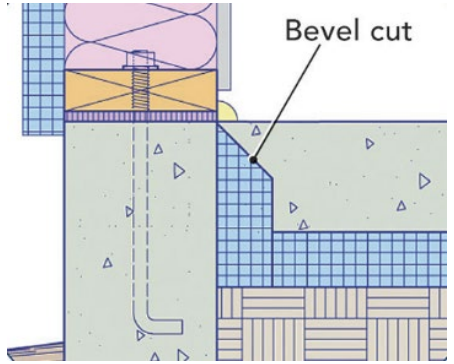
Attic Hatch



Attic Edge



Walls



Slab Edge

Background

- These details improved comfort and efficiency, when incorporated.
- However, numerous exemptions were added to the program.
- Furthermore, the ANSI 301 standard for energy ratings advanced to better capture these details in energy modeling.
- The thermal bridging section also included a requirement for continuous insulation for mass and metal-framed walls, and minimum insulation for concrete floors.

Overview of change

- Moved those two mandatory requirements, continuous insulation for mass or metal-framed walls & concrete floor insulation, from Section 3 to Section 1.

Rev. 04 Rater Field Checklist

3. Reduced Thermal Bridging				
3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8. [10, 19]	☐	☐	☐	☐
3.2 For insulated ceilings with attic space above, attic access panels and drop-down stairs insulated ≥ R-10 or equipped with durable ≥ R-10 cover. [20]	☐	☐	☐	☐
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8. [10]	☐	☐	☐	☐
3.4 For slabs on grade in CZ 4-8, 100% of slab edge insulated to ≥ R-5 at a depth of 2 ft., or 4 ft. for heated slabs in CZ 6-8, & aligned with the thermal boundary of the walls. [10, 21, 22]	☐	☐	☐	☐
3.5 For above-grade and at-grade concrete floor edges (e.g., podiums, balconies) in CZ 4-8, 100% of floor edge insulated to ≥ R-5 & aligned with the thermal boundary of the walls. At this boundary, concrete floors resting on mass walls must provide insulation that extends ≥8 ft. below the bottom of the floor edge & for floors resting on columns, insulation must surround the column, at a depth of 4ft. Alternatives in Fn. 24. [10,23]	☐	☐	☐	☐
3.6 For concrete slab floors in CZ 4-8 above ambient conditions, garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. [10, 25]	☐	☐	☐	☐
3.7 At above-grade walls and rim / band joists separating conditioned space from the exterior, one of the following options used: [26, 27]				
3.7.1 Continuous rigid insulation, insulated siding, or combination of the two is: ≥ R-3 in CZ 1-4; ≥ R-5 in CZ 5-8 [10, 27, 28, 29, 30], **OR**;	☐	☐	☐	☐
3.7.2 Structural Insulated Panels **OR**; Insulated Concrete Forms **OR**; Double-wall framing **OR**; [27, 28, 31]	☐	☐	☐	☐
3.7.3 For wood-framed walls in CZ 1-5 (all stories) & in CZ 6-8 (≤3 stories) only: 'advanced framing' details including all Items below: [27, 32]				
3.7.3a Corners insulated ≥ R-6 to edge [33], **AND**;	☐	☐	☐	☐
3.7.3b Headers above windows & doors insulated ≥ R-3 for 2x4 framing or equivalent cavity width, and ≥ R-5 for all other assemblies (e.g., with 2x6 framing) [34], **AND**;	☐	☐	☐	☐
3.7.3c Interior / exterior wall intersections insulated to same R-value as rest of exterior wall. [35]	☐	☐	☐	☐
3.7.3d In CZ 4C and 5, for > 3 stories, ≥ 5.5" framing depth used with wall cavity insulated ≥R-20.0.	☐	☐	☐	☐

Rev. 05 Rater Field Checklist

1. High-Performance Insulation & Fenestration	Correct	Verified [3]	Verified [4]	N/A [5]
1.1 Insulation meets specifications in National Rater Design Review Checklist Item 2.1.	☐	Pre-rock+20 ☐	☐	-
1.2 All insulation achieves Grade I install. per ANSI / RESNET / ICC 301. Alternatives in Footnote 6. [7]	☐	Pre-rock+20 ☐	☐	-
1.3 Fenestration meets specifications in National Rater Design Review Checklist Items 2.1 & 2.2.	☐	-	☐	-
1.4 Prescriptive Path: Window-to-wall ratio ≤ 30%. [8]	☐	-	☐	☐
1.5 For mass or metal-framed above-grade walls (including floor perimeter edges), continuous rigid insulation, insulated siding, or combination of the two is: ≥ R-3 in CZ 1-4; ≥ R-5 in CZ 5-8. [9, 10,11, 12, 13, 14]	☐	≤ 20 sq. ft. ☐	☐	☐
1.6 For concrete slab floors in CZ 4-8 above ambient conditions, heated or unheated garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. Alternative in Fn. 15. [9, 16]	☐	≤ 20 sq. ft. ☐	☐	☐

Overview of change

- Converted five mandatory features to a list of details that must be assessed so they can be accurately reflected in the final energy model and thermal backstop.

Rev. 04 Rater Field Checklist

3. Reduced Thermal Bridging
3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8. [10, 19]
3.2 For insulated ceilings with attic space above, attic access panels and drop-down stairs insulated ≥ R-10 or equipped with durable ≥ R-10 cover. [20]
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8. [10]
3.4 For slabs on grade in CZ 4-8, 100% of slab edge insulated to ≥ R-5 at a depth of 2 ft., or 4 ft. for heated slabs in CZ 6-8, & aligned with the thermal boundary of the walls. [10, 21, 22]
3.5 For above-grade and at-grade concrete floor edges (e.g., podiums, balconies) in CZ 4-8, 100% of floor edge insulated to ≥ R-5 & aligned with the thermal boundary of the walls. At this boundary, concrete floors resting on mass walls must provide insulation that extends ≥8 ft. below the bottom of the floor edge & for floors resting on columns, insulation must surround the column, at a depth of 4ft. Alternatives in Fn. 24.[10,23]
3.6 For concrete slab floors in CZ 4-8 above ambient conditions, garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. [10, 25]
3.7 At above-grade walls and rim / band joists separating conditioned space from the exterior, one of the follow

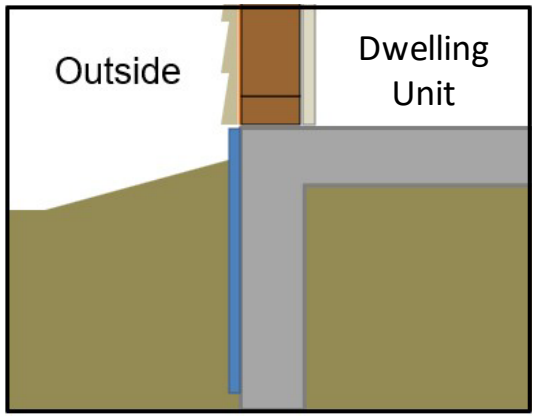
For example, mandatory requirement for slab insulation is now a mandatory assessment of whether insulation is present.

Rev. 05 Rater Field Checklist

3. Reduced Thermal Bridging – Reduced thermal bridging strategies are not mandatory. However, the following details must be accurately assessed per ANSI / RESNET / ICC 301 and Footnote 28. [26]				
3.1 Insulated ceilings assessed at the attic edge for variance in R-value and install quality.	☐	-	☐	☐
3.2 Insulation assessed beneath attic platforms and walkways for variance in R-value.	☐	-	☐	☐
3.3 Attic access panels and drop-down stairs assessed for insulated covers.	☐	-	☐	☐
3.4 Wood-framed above-grade walls separating conditioned from unconditioned space assessed for advanced framing.	☐	-	☐	☐
3.5 Above-grade and at-grade concrete floor edges (e.g., podiums, balconies, projected slabs) assessed for a complete thermal break per Footnote 28 and, in CZ 4-8, total building UA documented in the Multifamily Workbook.[9, 27, 28, 29]	☐	-	☐	☐
3.6 Slabs on grade assessed for insulation where walls separate conditioned from unconditioned space. [30]	☐	-	☐	☐

Overview of change

- With Rev. 05, buildings are no longer mandated to include slab edge insulation, advanced framing, etc. However, buildings without such features will have to compensate with other features to achieve the same performance target and thermal backstop.



R-10 to 2 ft depth
F-Factor = 0.54

Sample 3 Story 55,000sf National v1.1 Building in CZ 4

Slab Insulation	F-Factor	UA
None	0.73	730
Thermal Backstop	0.54	540
Impact		190 (5%)

How to make use of the new allowances?

- While for SFNH, to use these details you must certify to Rev. 14 of that program, for MFNC you can use these updated allowances if compliance with the thermal backstop is documented in ERI software or the Multifamily Workbook.

#4 of 10. National Rater Field Checklist: **Alternative minimum mass floor insulation**

Background

- Prior to Rev. 05, concrete floors were required to be insulated to the full 2009 commercial code levels.

Overview of Change

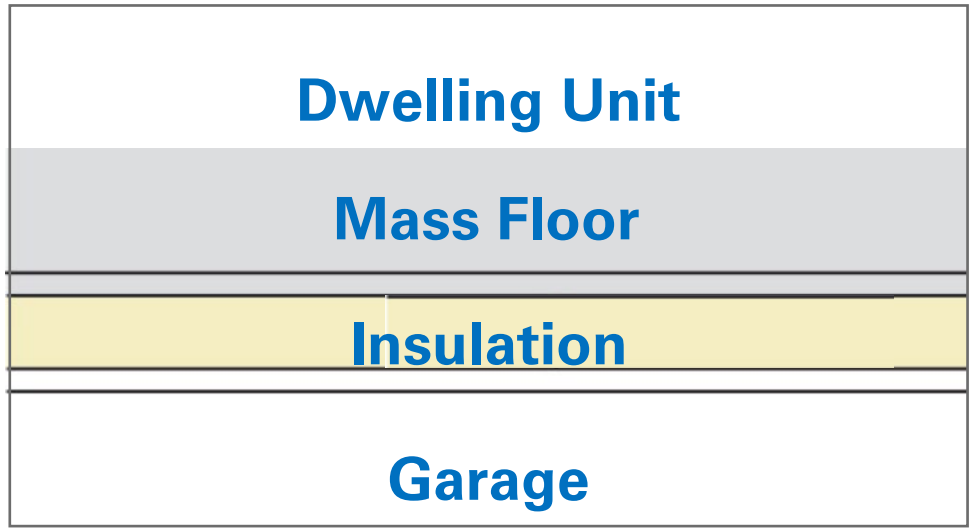
- In Rev, 05, an alternative has been added to Item 1.6, mandatory concrete floor insulation. A higher U-factor of 0.123 (~R-5) for the concrete floor is allowed, IF the thermal backstop is still met AND is documented using the Multifamily Workbook:
  - The concrete floor must be included as a line in the Multifamily Workbook UA calculation.
  - The floor will be compared to the full thermal backstop requirement per Item 2.1 of the Rater Design Review Checklist.
  - Where the floor assembly is only insulated to U-0.123, other assemblies will need to make up for it.

1.6 For concrete slab floors in CZ 4-8 above ambient conditions, heated or unheated garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. Alternative in Fn. 15. [9, 16]

15. As an alternative to the insulation in Table 502.1.2, a maximum U-factor of 0.123 is permitted where compliance with Item 2.1 of the Rater Design Review Checklist is documented using the Multifamily Workbook and the concrete slab floor is explicitly entered as a row in the table.

Overview of Change

- For example, for an ERI Path building under v1.1, prior to Rev. 05 in CZ 6, U-0.057 (~R-14.6) was required for floors under dwelling units.
- With Rev. 05, the maximum allowed is U-0.123 (~R-5). However, when demonstrating compliance with the UA, the mass floor will be compared to U-0.057. Any UA difference must be made up by other assemblies.



Assembly is U-0.123 (~R-5).

When documented in the MF Workbook, floor will be compared to U-0.057 for the UA calculation.

#5 of 10. National Rater Field Checklist: **Narrowed the scope of builder-verified items**

Background

- Prior to Rev. 05, at the discretion of the Rater, builders were permitted to verify up to eight (8) checklist items.
- We provided little guidance on how much of each item was permitted to be verified by the builder.

For example, when builder-verified, are builders permitted to verify air barrier for the entire ceiling, or just a subset?

Item 2.1 Fully-aligned air barrier for dropped ceilings / soffits below unconditioned attics, chase / dead space, and all other ceilings

Overview of change

- Triaged Items into three groups – those that:
  a) May not be verified by the builder because of ease of Rater verification or importance.
  b) May be partially verified by the builder but should not be wholly builder-verified.
  c) May be fully verified by the builder due to logistical issues.

- Reduced allotment of builder-verified items from eight (8) to five (5).

Overview of change

Thermal Enclosure System 1. High-Performance Insulation & Fenestration	Must Correct	Builder Verified [3]	Rater Verified [4]	N/A [5]
1.1 Insulation meets specifications in National Rater Design Review Checklist Item 2.1.	☐	Pre-rock+20 ☐	☐	-
1.2 All insulation achieves Grade I install. per ANSI / RESNET / ICC 301. Alternatives in Footnote 6. [7]	☐	Pre-rock+20 ☐	☐	-
1.3 Fenestration meets specifications in National Rater Design Review Checklist Items 2.1 & 2.2.	☐	-	☐	-
1.4 Prescriptive Path: Window-to-wall ratio ≤ 30%. [8]	☐	-	☐	☐
1.5 For mass or metal-framed above-grade walls (including floor perimeter edges), continuous rigid insulation, insulated siding, or combination of the two is: ≥ R-3 in CZ 1-4; ≥ R-5 in CZ 5-8. [9, 10,11, 12, 13, 14]				
1.6 For concrete slab floors in CZ 4-8 above ambient conditions, heated or unheated garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. Alternative in Fn. 15. [9, 16]				
1.7 Heated plenums in unconditioned space or ambient conditions must meet the following requirements: [17]				
1.7.1 Sides of heated plenum are an air barrier and insulated to ≥ R-3ci in CZ 1-4; ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8, [9] **AND;**				
1.7.2 Insulation at top of heated plenum meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC, [9, 18] **AND;**				
1.7.3 Bottom of heated plenum must have at least R-13 insulation. [18, 19]				
1.8 Garages with space heating must meet the following requirements: [17]				
1.8.1 Insulation on above grade walls and walls on the first story below grade ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8, [9] **AND;**	☐	≤ 20 sq. ft. ☐	☐	☐
1.8.2 Ceiling insulation meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC. [9]	☐	≤ 20 sq. ft. ☐	☐	☐

Within each dwelling unit, up to 200 sq. ft. of wall areas that have drywall installed prior to general installation of drywall (i.e., "pre-rock" areas such as walls behind tubs or staircases), plus an additional 20 sq. ft., may be builder verified. . In the remainder of the building, up to 500 sq. ft. of wall areas that have drywall installed prior to general installation of drywall, plus an additional 50 sq. ft., may be builder verified.

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Overview of change

Thermal Enclosure System 1. High-Performance Insulation & Fenestration	Must Correct	Builder Verified [3]	Rater Verified [4]	N/A [5]
1.1 Insulation meets specifications in National Rater Design Review Checklist Item 2.1.	☐	Pre-rock+20 ☐	☐	-
1.2 All insulation achieves Grade I install. per ANSI / RESNET / ICC 301. Alternatives in Footnote 6. [7]	☐	Pre-rock+20 ☐	☐	-
1.3 Fenestration meets specifications in National Rater Design Review Checklist Items 2.1 & 2.2.	☐	-	☐	☐
1.4 Prescriptive Path: Window-to-wall ratio ≤ 30%. [8]	☐	-	☐	☐
1.5 For mass or metal-framed above-grade walls (including floor perimeter edges), continuous rigid insulation, insulated siding, or combination of the two is: ≥ R-3 in CZ 1-4; ≥ R-5 in CZ 5-8. [9, 10, 11, 12, 13, 14]	☐	≤ 20 sq. ft. ☐	☐	☐
1.6 For concrete slab floors in CZ 4-8 above ambient conditions, heated or unheated garages, or unconditioned spaces outside the thermal boundary, floor insulation meets the U-factor specified in Table 502.1.2 of the 2009 IECC for Group R when dwelling units are above the slab, & 'All Other' when common space is above the slab. Alternative in Fn. 15. [9, 16]	☐	≤ 20 sq. ft. ☐	☐	☐
1.7 Heated plenums in unconditioned space or ambient conditions must meet the following requirements: [17]				
1.7.1 Sides of heated plenum are an air barrier and insulated to ≥ R-3ci in CZ 1-4; ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8, [9] **AND;**	☐	≤ 20 sq. ft. ☐	☐	☐
1.7.2 Insulation at top of heated plenum meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC, [9, 18] **AND;**	☐	≤ 20 sq. ft. ☐	☐	☐
1.7.3 Bottom of heated plenum must have at least R-13 insulation. [18, 19]	☐	≤ 20 sq. ft. ☐	☐	☐
1.8 Garages with space heating must meet the following requirements: [17]				
1.8.1 Insulation on above grade walls and walls on the first story below grade ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8, [9] **AND;**	☐	≤ 20 sq. ft. ☐	☐	☐
1.8.2 Ceiling insulation meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC. [9]	☐	≤ 20 sq. ft. ☐	☐	☐

Not eligible to be builder verified.

Up to 20 sq. ft. of area per dwelling unit, and 50 sq. ft. in the remainder of the building, may be verified by the builder.

Overview of change

2. Fully-Aligned Air Barriers [20] At each insulated location below, a complete air barrier is provided that is fully aligned as follows:					
Ceilings: At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8. Also, at exterior vertical surface of ceiling insulation in all climate zones (e.g., using a wind baffle that extends to the full height of the insulation in every bay or a tabbed baffle in each bay with a soffit vent that prevents wind washing in adjacent bays). [9, 21]					
2.1 Dropped ceilings / soffits below unconditioned attics, chase / dead space, and all other ceilings.	☐	≤ 20 sq. ft. ☐	☐	☐	
Walls: At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8. [9, 22]					
2.2 Walls behind showers, tubs, staircases, and fireplaces.	☐	≤ 20 sq. ft. ☐	☐	☐	
2.3 Architectural bump-outs, dead space, and all other exterior walls.	☐	≤ 20 sq. ft. ☐	☐	-	
Floors: At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment. Alternatives in Footnotes 22 & 23. [23, 24, 25]					
2.4 Floors above garages, floors above unconditioned spaces, and cantilevered floors.	☐	≤ 20 sq. ft. ☐	☐	☐	
2.5 All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof).	☐	≤ 20 sq. ft. ☐	☐	☐	

Up to 20 sq. ft. of area per dwelling unit, and 50 sq. ft. in the remainder of the building, may be verified by the builder.

Overview of change

3. Reduced Thermal Bridging – Reduced thermal bridging strategies are not mandatory. However, the following details must be accurately assessed per ANSI / RESNET / ICC 301 and Footnote 28. [26]				
3.1 Insulated ceilings assessed at the attic edge for variance in R-value and install quality.	☐	-	☐	☐
3.2 Insulation assessed beneath attic platforms and walkways for variance in R-value.	☐	-	☐	☐
3.3 Attic access panels and drop-down stairs assessed for insulated covers.	☐	-	☐	☐
3.4 Wood-framed above-grade walls separating conditioned from unconditioned space assessed for advanced framing.	☐	-	☐	☐
3.5 Above-grade and at-grade concrete floor edges (e.g., podiums, balconies, projected slabs) assessed for a complete thermal break per Footnote 28 and, in CZ 4-8, total building UA documented in the Multifamily Workbook. [9, 27, 28, 29]	☐	-	☐	☐
3.6 Slabs on grade assessed for insulation where walls separate conditioned from unconditioned space. [30]	☐	-	☐	☐

Not eligible to be builder verified.

Overview of change

4. Air Sealing	Must Correct	Builder Verified [3]	Rater Verified [4]	N/A [5]
Rater has verified each air sealing detail below. Unless otherwise specified, items apply to assemblies in dwelling units and common spaces where adjacent to the exterior, other buildings, or unconditioned spaces. "Sealed" indicates the use of caulk, foam, or equivalent material.				
4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations are sealed, with blocking / flashing as needed.	☐	≤ 2 penetrations ☐	☐	☐
4.2 Attic access panels, roof hatches and drop-down stairs are gasketed, (i.e., not caulked) or equipped with covers that are gasketed.	☐	-	☐	☐
4.3 Recessed lighting fixtures are ICAT labeled and gasketed.	☐	No limit ☐	☐	☐
4.4 Drywall is sealed to top plate during installation, or from the attic side at all unconditioned attic / wall interfaces. Drywall adhesive (but not other construction adhesives), is permitted to be used.	☐	No limit ☐	☐	☐
4.5 Rough opening around windows & exterior doors is sealed.	☐	-	☐	☐
4.6 Assemblies that separate attached garages from occupiable space are sealed. In addition, an air barrier is installed, sealed, and aligned with these assemblies. [31]	☐	-	☐	☐
4.7 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions are made substantially air-tight with door seal and weatherstripping or equivalent gasket.	☐	-	☐	☐

The builder may fully verify the item.

Up to two penetrations per dwelling unit and five in the remainder of the building may be builder verified.

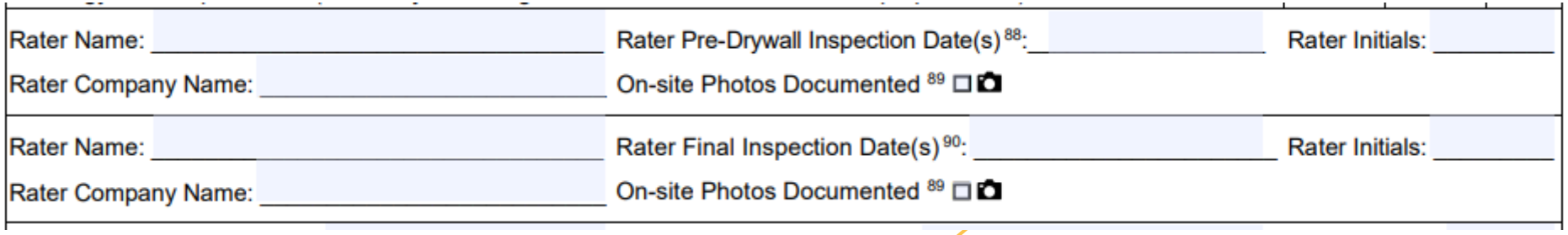
#6 of 10. National Rater Field Checklist: **Raters required to capture specific photos, including a selfie**

Background

- Prior to Rev. 05, for the ASHRAE and Prescriptive Path, Raters were required to take photos according to the Photo Guidance Document.
- For the ERI Path, Raters were required to take photos of certain Minimum Rated Features, per ANSI / RESNET / ICC 301, but no photos were explicitly required of ENERGY STAR-specific program requirements.

Overview of Change

- As part of the quality assurance and quality control enhancements to the ENERGY STAR Certification System, Rev. 05 requires that Raters capture photos covering key requirements according to the Photo Guidance Document, which now also includes a Rater "selfie" photo at each inspection.



A checkbox with the caption "On-site Photos Documented" has been added next to each inspection date / signature row to indicate the requirement to confirm photos have been taken.

Overview of Change

- As part of the quality assurance and quality control enhancements to the ENERGY STAR Certification System, Rev. 05 requires that Raters capture photos covering key requirements according to the Photo Guidance Document, which now also includes a Rater "selfie" photo at each inspection.

ENERGY STAR Multifamily New Construction
Photo Documentation Guidance Document (Rev. 05)

Use this document as a guideline to comply with the photo documentation requirements of the ENERGY STAR MFNC program. Provide your MRO or HCO with a copy of all applicable photos or documents listed below. Name files accordingly or save in appropriately named sub-folders. Clarify photo content in a separate document as needed. Ensure that nameplates and details demonstrating compliance are clearly identifiable in the photo. Photos are not required for non-applicable items marked "N/A" in the applicable checklist. In addition to the photos below, for the ERI Path, the Rater must also capture all photos required by the on-site inspection protocols in Normative Appendix B of ANSI / RESNET / ICC 301.

For properties with multiple buildings, the Rater must take photos from all buildings. However, a representative photo of each unique item or component for the property may be provided to the MRO or HCO. Be able to share additional photo documentation for each building upon request.

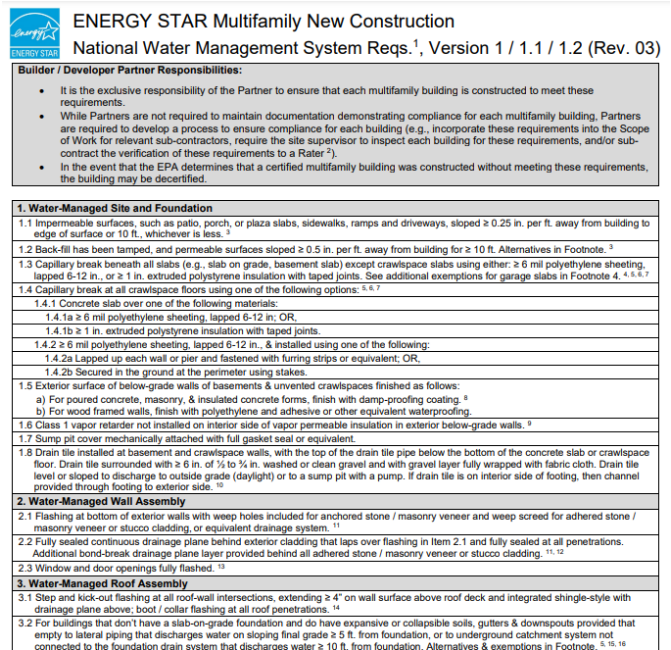
0 - GENERAL

1. Include a geo-tagged and time-stamped photo of the Rater in front of the building during each inspection.

#7 of 10. Water Management System: **Sunset the Water Management System Builder Requirements**

Background

- Prior to Rev. 05, builders or developers were required to complete the Water Management System (WMS) Requirements, a one-page list of commonsense details to improve durability.
- While valuable, these details are not verified by the Rater.



ENERGY STAR Multifamily New Construction
National Water Management System Reqs.[1], Version 1 / 1.1 / 1.2 (Rev. 03)

Builder / Developer Partner Responsibilities:

- It is the exclusive responsibility of the Partner to ensure that each multifamily building is constructed to meet these requirements.
- While Partners are not required to maintain documentation demonstrating compliance for each multifamily building, Partners are required to develop a process to ensure compliance for each building (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each building for these requirements, and/or sub-contract the verification of these requirements to a Rater [2]).
- In the event that the EPA determines that a certified multifamily building was constructed without meeting these requirements, the building may be decertified.

1. Water-Managed Site and Foundation
1.1 Impermeable surfaces, such as patio, porch, or plaza slabs, sidewalks, ramps and driveways, sloped ≥ 0.25 in. per ft. away from building to edge of surface or 10 ft., whichever is less. [3]
1.2 Back-fill has been tamped, and permeable surfaces sloped ≥ 0.5 in. per ft. away from building for ≥ 10 ft. Alternatives in Footnote. [3]
1.3 Capillary break beneath all slabs (e.g., slab on grade, basement slab) except crawlspace slabs using either: ≥ 6 mil polyethylene sheeting, lapped 6-12 in., or ≥ 1 in. extruded polystyrene insulation with taped joints. See additional exemptions for garage slabs in Footnote 4. [4, 5, 6, 7]
1.4 Capillary break at all crawlspace floors using one of the following options: [5, 6, 7]
1.4.1 Concrete slab over one of the following materials:
1.4.1a ≥ 6 mil polyethylene sheeting, lapped 6-12 in; OR,
1.4.1b ≥ 1 in. extruded polystyrene insulation with taped joints.
1.4.2 ≥ 6 mil polyethylene sheeting, lapped 6-12 in., & installed using one of the following:
1.4.2a Lapped up each wall or pier and fastened with furring strips or equivalent; OR,
1.4.2b Secured in the ground at the perimeter using stakes.
1.5 Exterior surface of below-grade walls of basements & unvented crawlspaces finished as follows: a) For poured concrete, masonry, & insulated concrete forms, finish with damp-proofing coating. [8] b) For wood framed walls, finish with polyethylene and adhesive or other equivalent waterproofing.
1.6 Class 1 vapor retarder not installed on interior side of vapor permeable insulation in exterior below-grade walls. [9]
1.7 Sump pit cover mechanically attached with full gasket seal or equivalent.
1.8 Drain tile installed at basement and crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. Drain tile surrounded with ≥ 6 in. of ⅛ to ¾ in. washed or clean gravel and with gravel layer fully wrapped with fabric cloth. Drain tile level or sloped to discharge to outside grade (daylight) or to a sump pit with a pump. If drain tile is on interior side of footing, then channel provided through footing to exterior side. [10]
2. Water-Managed Wall Assembly
2.1 Flashing at bottom of exterior walls with weep holes included for anchored stone / masonry veneer and weep screed for adhered stone / masonry veneer or stucco cladding, or equivalent drainage system. [11]
2.2 Fully sealed continuous drainage plane behind exterior cladding that laps over flashing in Item 2.1 and fully sealed at all penetrations. Additional bond-break drainage plane layer provided behind all adhered stone / masonry veneer or stucco cladding. [11, 12]
2.3 Window and door openings fully flashed. [13]
3. Water-Managed Roof Assembly
3.1 Step and kick-out flashing at all roof-wall intersections, extending ≥ 4" on wall surface above roof deck and integrated shingle-style with drainage plane above; boot / collar flashing at all roof penetrations. [14]
3.2 For buildings that don't have a slab-on-grade foundation and do have expansive or collapsible soils, gutters & downspouts provided that empty to lateral piping that discharges water on sloping final grade ≥ 5 ft. from foundation, or to underground catchment system not connected to the foundation drain system that discharges water ≥ 10 ft. from foundation. Alternatives & exemptions in Footnote. [5, 15, 16]

Overview of change

- Water Management System Requirements have been sunset with Rev. 05.
- This will improve the program's quality control by significantly reducing the number of requirements that are not third-party verified.
- WMS will be archived and available to builders or other entities, such as utilities, which may choose to continue implementing them.
- Additional guidance on these details remains available in the Building America Solutions Center.
- Water management requirements will continue to be maintained and enhanced as part of the EPA's Indoor AirPLUS program.

#8 of 10. ASHRAE Path: **Streamlined targets, documentation, and a new fuel neutral approach**

Background

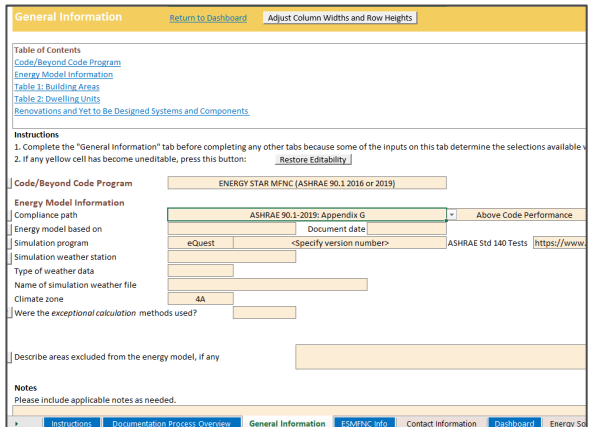
- Prior to Rev. 05, the ASHRAE target for National v1.1 depended on the state code, and multiple document options were allowed for National v1.1 and 1.2.

ASHRAE Path Version 1.1 Performance Target and Documentation

State Code	Performance Target Options	Appendix G	Documentation
2012 IECC / 90.1-2010	15% over 90.1-2010 OR	Appendix G 2010	APC
	20% over 90.1-2007	Appendix G 2007	APC
2015 IECC / 90.1-2013	15% over 90.1-2013,	Appendix G 2016	APC_2016, OR DOE Compliance Form
	20% over 90.1-2010, OR	Appendix G 2010	APC
	25% over 90.1-2007	Appendix G 2007	APC
2018 IECC / 90.1-2016 2021 IECC / 90.1-2019	15% over 90.1-2016	Appendix G 2016	APC_2016, OR DOE Compliance Form

Background

- Prior to Rev. 05, the ASHRAE target for National v1.1 depended on the state code, and multiple document options were allowed for National v1.1 and 1.2.
- There are two DOE-supported Excel-based tools now available:
  1. ASHRAE Standard 90.1 Performance-Based Compliance Form and
  2. ENERGY STAR MFNC / ZERH Companion Tool
- These spreadsheets document ASHRAE models with built-in QA functions & have the ENERGY STAR and Zero Energy Ready Home performance targets built-in.



Overview of Change

- The performance target for the ASHRAE Path in National v1.1 will be 15% savings over ASHRAE 90.1-2016.
  - More than 95% of recent ASHRAE Path certifications were from states requiring ASHRAE 90.1-2016 or later.
- All buildings pursuing the ASHRAE Path will be modeled using Appendix G from ASHRAE 90.1-2016 or later.
- All ASHRAE models will be documented using the ASHRAE Standard 90.1 Performance-Based Compliance Form and the ENERGY STAR MFNC / ZERH Companion Tool.
  - Free training on the Compliance Form is available: https://training.energycodes.gov/ui/course/1867/preview/true

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Overview of Change

- The ENERGY STAR MFNC / ZERH Companion Tool calculates the performance target through both the approach in Appendix G as well as the new fuel neutral approach. A building may demonstrate compliance through energy cost savings (using either approach) or source energy savings using the Appendix G approach.

Table 4: Compliance Calculations

Parameter	Symbol	Performance Metric			
		Cost $	Site Energy MMBtu	Source Energy MMBtu	GHG Emissions Mt CO_2e
Proposed building performance before site-generated renewable energy and exceptional calculations	$PBP_{nre\ nec}$	$67,539	1,443	4,038	0
? On-site renewable savings	-	-	-	-	-
? Exceptional calculations savings excluding on-site renewable energy	-	-	-	-	-
Proposed building performance including on-site renewable energy and exceptional calculations	PBP	$67,539	1,443	4,038	0
Proposed building performance including exceptional calculations and excluding on-site renewables	PBP_{nre}	$67,539	1,443	4,038	0
Baseline building unregulated energy, GHG emissions, and/or energy cost	BBUEC	$22,791	487	1,363	-
Baseline building regulated energy, GHG emissions, and/or energy cost	BBREC	$51,586	2,549	3,869	99
Baseline building performance	BBP	$74,377	3,036	5,232	99
Building Performance Factor	BPF	0.78	n/a	0.78	n/a
Performance Index Target	PCI_t	0.85	n/a	0.84	n/a
Performance index without on-site renewable energy and exceptional calculations	$PCI_{nre\ nec}$	0.91	n/a	0.77	n/a
Performance index including exceptional calculations	PCI_{ec}	0.91	n/a	0.77	n/a
Performance index including exceptional calculations and on-site renewable energy	PCI	0.91	n/a	0.77	n/a
? Performance Index adjusted based upon ASHRAE 90.1-2019 Section 4.2.1.1	$PCI_{adjusted}$	0.91	n/a	0.77	n/a
% improvement target beyond ASHRAE 90.1-2016	-	*15%*	-	*15%*	-
% improvement beyond ASHRAE 90.1-2016, excluding on-site renewable energy and exceptional calculations	-	**-7.2%**	**n/a**	**7.8%**	**n/a**
% improvement beyond ASHRAE 90.1-2016, inclusive of on-site renewable energy and exceptional calculations	-	**-7.2%**	**n/a**	**7.8%**	**n/a**

PROJECT DOES NOT COMPLY. The Performance Index (PCIadjusted) exceeds the Performance Index Target (PCIt) for all allowed metrics. The project does not comply with the performance requirement of the ENERGY STAR MFNC Version 1.1 via the Appendix G Performance Rating Method. Allowed metrics: Cost, Source Energy. Performance target: 15%

ENERGY STAR

Overview of Change

- The ENERGY STAR MFNC / ZERH Companion Tool calculates the performance target through both the approach in Appendix G as well as the new fuel neutral approach. A building may demonstrate compliance through energy cost savings (using either approach) or source energy savings using the Appendix G approach.

Table 5: Fuel Neutral Compliance Calculations

Parameter	Symbol	Performance Metric			
		Cost $	Site Energy MMBtu	Source Energy MMBtu	GHG Emissions Mt CO_2e
Proposed building performance before site-generated renewable energy and exceptional calculations	PBP_{nre_nec}	$67,539	1,443	4,038	0
? On-site renewable savings	-	-	-	-	-
? Exceptional calculations savings excluding on-site renewable energy	-	-	-	-	-
Proposed building performance including on-site renewable energy and exceptional calculations	PBP	$67,539	1,443	4,038	0
Baseline building performance	BBP	$74,377	3,036	5,232	99
Fuel neutral baseline building performance based on proposed fuel allocation without including savings from exceptio	BBP_{fn}	$141,952	3,036	8,489	0
Adjusted baseline building performance using the fuel neutral SEEUPF method to ASHRAE 90.1-2016	BBP_{Adj}	$81,523	1,745	4,876	0
% improvement target beyond ASHRAE 90.1-2019	-	*15%*	-	-	-
% improvement beyond ASHRAE 90.1-2016, excluding on-site renewable energy and exceptional calculations	-	**17.2%**	**n/a**	**n/a**	**n/a**
% improvement beyond ASHRAE 90.1-2016, inclusive of on-site renewable energy and exceptional calculations	-	**17.2%**	**n/a**	**n/a**	**n/a**

PROJECT COMPLIES WITH PERFORMANCE REQUIREMENT. The design energy cost, site energy, source energy, and/or carbon emissions does not exceed the energy cost, site energy, source energy, and/or carbon emission of the adjusted baseline. The project complies with the performance requirement of ENERGY STAR MFNC Version 1.1 via the Appendix G Performance Rating Method. Allowed metrics: Cost, Source Energy. Performance target: 15%

ENERGY STAR

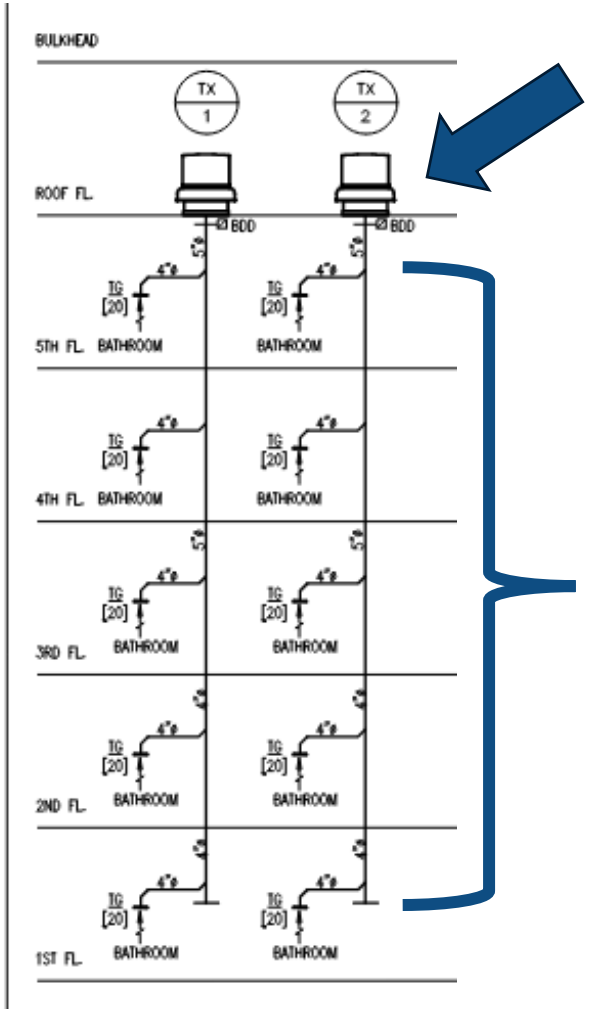
#9 of 10. National Rater Field Checklist: **Changes to Central Exhaust Leakage Test Requirements**

Background

- Duct leakage testing is required for any central exhaust system serving four or more dwelling units, including exhaust risers of central ERV/HRVs.
- Leakage allowances are based on a percentage of total fan exhaust and different allowances available based on testing at rough-in or final, similar to testing dwelling-unit ductwork for leakage.

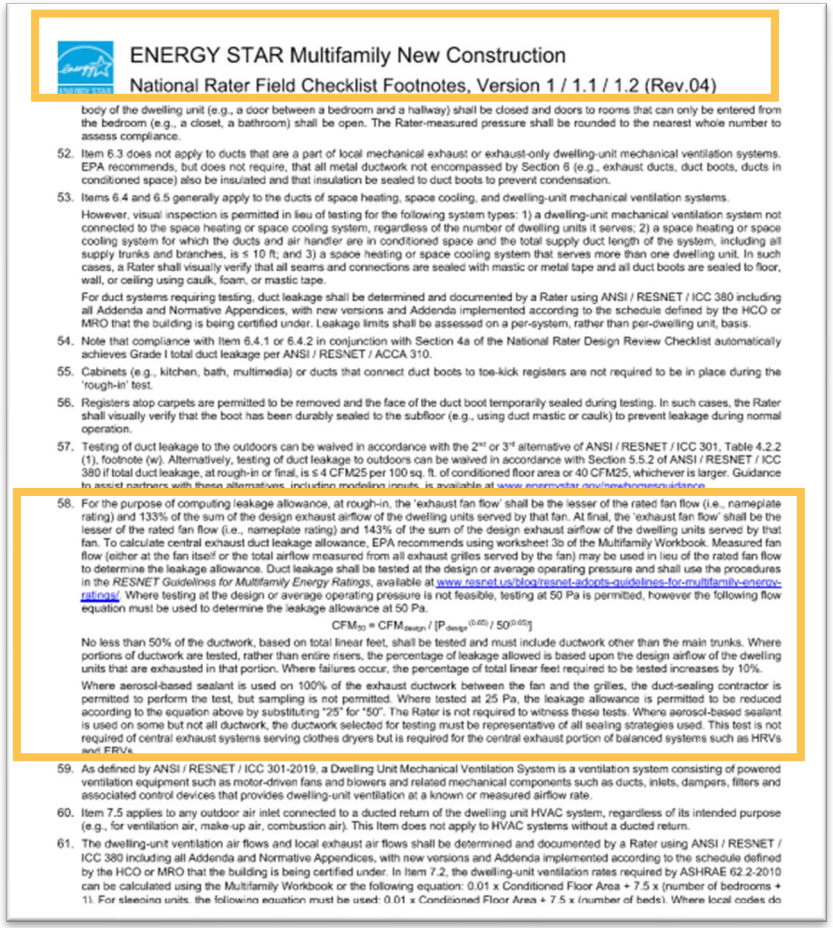
Overview of Change

- To make it easier to understand, one large footnote has been separated into multiple footnotes
- Footnote text has been revised to better explain sampling and documentation required
- Footnotes introduce an alternative test procedure
  - Total FAN flow – sum of all EXHAUST = Leakage



Overview of Change

Rev. 04



ENERGY STAR Multifamily New Construction
National Rater Field Checklist Footnotes, Version 1 / 1.1 / 1.2 (Rev.04)

body of the dwelling unit (e.g., a door between a bedroom and a hallway) shall be closed and doors to rooms that can only be entered from the bedroom (e.g., a closet, a bathroom) shall be open. The Rater-measured pressure shall be rounded to the nearest whole number to assess compliance.

52. Item 6.3 does not apply to ducts that are a part of local mechanical exhaust or exhaust-only dwelling-unit mechanical ventilation systems. EPA recommends, but does not require, that all metal ductwork not encompassed by Section 6 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation.
53. Items 6.4 and 6.5 generally apply to the ducts of space heating, space cooling, and dwelling-unit mechanical ventilation systems.

    However, visual inspection is permitted in lieu of testing for the following system types: 1) a dwelling-unit mechanical ventilation system not connected to the space heating or space cooling system, regardless of the number of dwelling units it serves; 2) a space heating or space cooling system for which the ducts and air handler are in conditioned space and the total supply duct length of the system, including all supply trunks and branches, is ≤ 10 ft; and 3) a space heating or space cooling system that serves more than one dwelling unit. In such cases, a Rater shall visually verify that all seams and connections are sealed with mastic or metal tape and all duct boots are sealed to floor, wall, or ceiling using caulk, foam, or mastic tape.

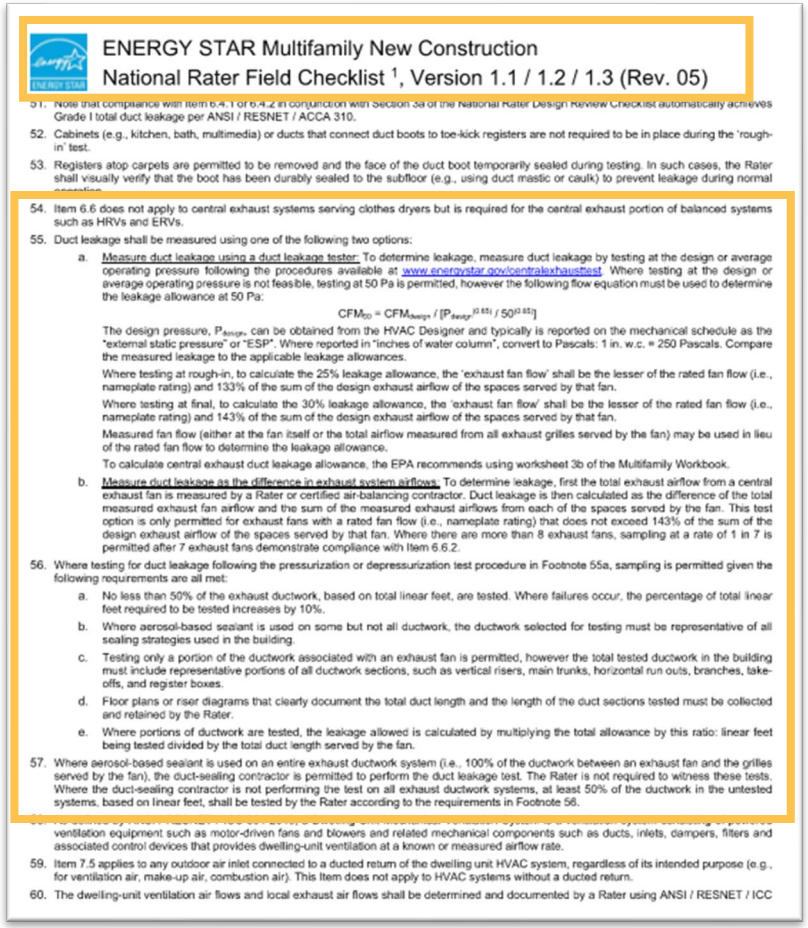
    For duct systems requiring testing, duct leakage shall be determined and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO or MRO that the building is being certified under. Leakage limits shall be assessed on a per-system, rather than per-dwelling unit, basis.
54. Note that compliance with Item 6.4.1 or 6.4.2 in conjunction with Section 4a of the National Rater Design Review Checklist automatically achieves Grade I total duct leakage per ANSI / RESNET / ACCA 310.
55. Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the 'rough-in' test.
56. Registers atop carpets are permitted to be removed and the face of the duct boot temporarily sealed during testing. In such cases, the Rater shall visually verify that the boot has been durably sealed to the subfloor (e.g., using duct mastic or caulk) to prevent leakage during normal operation.
57. Testing of duct leakage to the outdoors can be waived in accordance with the 2nd or 3rd alternative of ANSI / RESNET / ICC 301, Table 4.2.2 (1), footnote (w). Alternatively, testing of duct leakage to outdoors can be waived in accordance with Section 5.5.2 of ANSI / RESNET / ICC 380 if total duct leakage, at rough-in or final, is ≤ 4 CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM25, whichever is larger. Guidance to assist partners with these alternatives, including modeling inputs, is available at www.energystar.gov/newhomesguidance.
58. For the purpose of computing leakage allowance, at rough-in, the 'exhaust fan flow' shall be the lesser of the rated fan flow (i.e., nameplate rating) and 133% of the sum of the design exhaust airflow of the dwelling units served by that fan. At final, the 'exhaust fan flow' shall be the lesser of the rated fan flow (i.e., nameplate rating) and 143% of the sum of the design exhaust airflow of the dwelling units served by that fan. To calculate central exhaust duct leakage allowance, EPA recommends using worksheet 3b of the Multifamily Workbook. Measured fan flow (either at the fan itself or the total airflow measured from all exhaust grilles served by the fan) may be used in lieu of the rated fan flow to determine the leakage allowance. Duct leakage shall be tested at the design or average operating pressure and shall use the procedures in the *RESNET Guidelines for Multifamily Energy Ratings*, available at www.resnet.us/blog/resnet-adopts-guidelines-for-multifamily-energy-ratings/. Where testing at the design or average operating pressure is not feasible, testing at 50 Pa is permitted, however the following flow equation must be used to determine the leakage allowance at 50 Pa.

    $$CFM_{50} = CFM_{design} / [P_{design}^{(0.65)} / 50^{(0.65)}]$$

    No less than 50% of the ductwork, based on total linear feet, shall be tested and must include ductwork other than the main trunks. Where portions of ductwork are tested, rather than entire risers, the percentage of leakage allowed is based upon the design airflow of the dwelling units that are exhausted in that portion. Where failures occur, the percentage of total linear feet required to be tested increases by 10%.

    Where aerosol-based sealant is used on 100% of the exhaust ductwork between the fan and the grilles, the duct-sealing contractor is permitted to perform the test, but sampling is not permitted. Where tested at 25 Pa, the leakage allowance is permitted to be reduced according to the equation above by substituting "25" for "50". The Rater is not required to witness these tests. Where aerosol-based sealant is used on some but not all ductwork, the ductwork selected for testing must be representative of all sealing strategies used. This test is not required of central exhaust systems serving clothes dryers but is required for the central exhaust portion of balanced systems such as HRVs and ERVs.
59. As defined by ANSI / RESNET / ICC 301-2019, a Dwelling Unit Mechanical Ventilation System is a ventilation system consisting of powered ventilation equipment such as motor-driven fans and blowers and related mechanical components such as ducts, inlets, dampers, filters and associated control devices that provides dwelling-unit ventilation at a known or measured airflow rate.
60. Item 7.5 applies to any outdoor air inlet connected to a ducted return of the dwelling unit HVAC system, regardless of its intended purpose (e.g., for ventilation air, make-up air, combustion air). This Item does not apply to HVAC systems without a ducted return.
61. The dwelling-unit ventilation air flows and local exhaust air flows shall be determined and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO or MRO that the building is being certified under. In Item 7.2, the dwelling-unit ventilation rates required by ASHRAE 62.2-2010 can be calculated using the Multifamily Workbook or the following equation: 0.01 x Conditioned Floor Area + 7.5 x (number of bedrooms + 1). For sleeping units, the following equation must be used: 0.01 x Conditioned Floor Area + 7.5 x (number of beds). Where local codes do

Rev. 05



ENERGY STAR Multifamily New Construction
National Rater Field Checklist [1], Version 1.1 / 1.2 / 1.3 (Rev. 05)

51. Note that compliance with Item 6.4.1 or 6.4.2 in conjunction with Section 3a of the National Rater Design Review Checklist automatically achieves Grade I total duct leakage per ANSI / RESNET / ACCA 310.
52. Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the 'rough-in' test.
53. Registers atop carpets are permitted to be removed and the face of the duct boot temporarily sealed during testing. In such cases, the Rater shall visually verify that the boot has been durably sealed to the subfloor (e.g., using duct mastic or caulk) to prevent leakage during normal operation.
54. Item 6.6 does not apply to central exhaust systems serving clothes dryers but is required for the central exhaust portion of balanced systems such as HRVs and ERVs.
55. Duct leakage shall be measured using one of the following two options:
    a. Measure duct leakage using a duct leakage tester: To determine leakage, measure duct leakage by testing at the design or average operating pressure following the procedures available at www.energystar.gov/centralexhausttest. Where testing at the design or average operating pressure is not feasible, testing at 50 Pa is permitted, however the following flow equation must be used to determine the leakage allowance at 50 Pa:

       $$CFM_{50} = CFM_{design} / [P_{design}^{(0.65)} / 50^{(0.65)}]$$

       The design pressure, P_{design}, can be obtained from the HVAC Designer and typically is reported on the mechanical schedule as the "external static pressure" or "ESP". Where reported in "inches of water column", convert to Pascals: 1 in. w.c. = 250 Pascals. Compare the measured leakage to the applicable leakage allowances.

       Where testing at rough-in, to calculate the 25% leakage allowance, the 'exhaust fan flow' shall be the lesser of the rated fan flow (i.e., nameplate rating) and 133% of the sum of the design exhaust airflow of the spaces served by that fan.

       Where testing at final, to calculate the 30% leakage allowance, the 'exhaust fan flow' shall be the lesser of the rated fan flow (i.e., nameplate rating) and 143% of the sum of the design exhaust airflow of the spaces served by that fan.

       Measured fan flow (either at the fan itself or the total airflow measured from all exhaust grilles served by the fan) may be used in lieu of the rated fan flow to determine the leakage allowance.

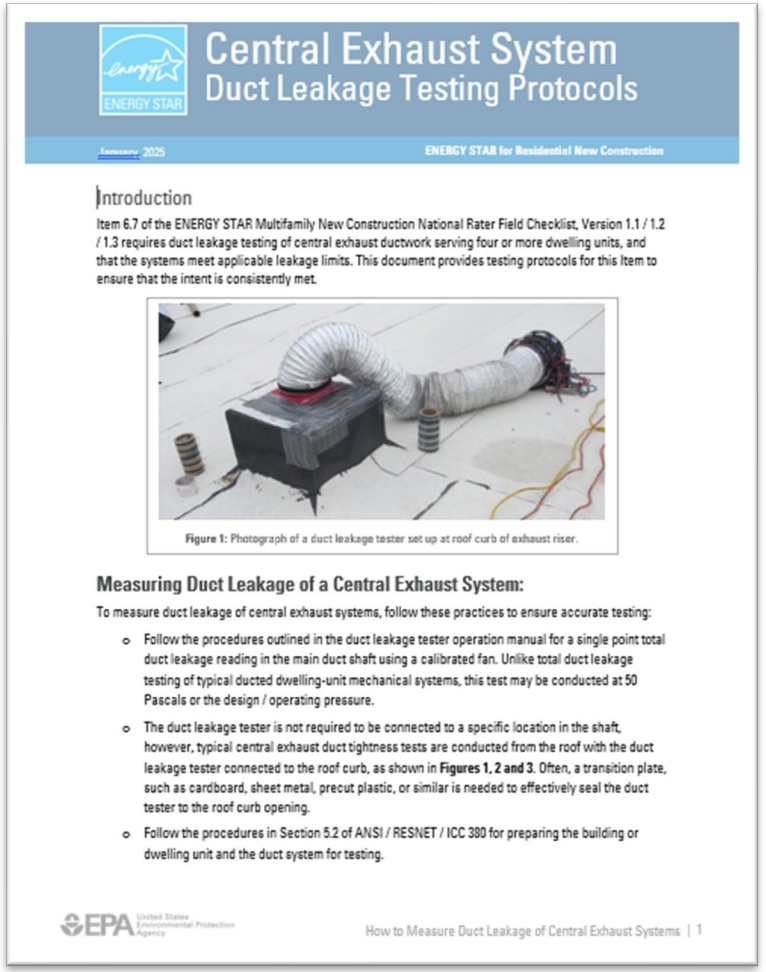
       To calculate central exhaust duct leakage allowance, the EPA recommends using worksheet 3b of the Multifamily Workbook.
    b. Measure duct leakage as the difference in exhaust system airflows. To determine leakage, first the total exhaust airflow from a central exhaust fan is measured by a Rater or certified air-balancing contractor. Duct leakage is then calculated as the difference of the total measured exhaust fan airflow and the sum of the measured exhaust airflows from each of the spaces served by the fan. This test option is only permitted for exhaust fans with a rated fan flow (i.e., nameplate rating) that does not exceed 143% of the sum of the design exhaust airflow of the spaces served by that fan. Where there are more than 8 exhaust fans, sampling at a rate of 1 in 7 is permitted after 7 exhaust fans demonstrate compliance with Item 6.6.2.
56. Where testing for duct leakage following the pressurization or depressurization test procedure in Footnote 55a, sampling is permitted given the following requirements are all met:
    a. No less than 50% of the exhaust ductwork, based on total linear feet, are tested. Where failures occur, the percentage of total linear feet required to be tested increases by 10%.
    b. Where aerosol-based sealant is used on some but not all ductwork, the ductwork selected for testing must be representative of all sealing strategies used in the building.
    c. Testing only a portion of the ductwork associated with an exhaust fan is permitted, however the total tested ductwork in the building must include representative portions of all ductwork sections, such as vertical risers, main trunks, horizontal run outs, branches, take-offs, and register boxes.
    d. Floor plans or riser diagrams that clearly document the total duct length and the length of the duct sections tested must be collected and retained by the Rater.
    e. Where portions of ductwork are tested, the leakage allowed is calculated by multiplying the total allowance by this ratio: linear feet being tested divided by the total duct length served by the fan.
57. Where aerosol-based sealant is used on an entire exhaust ductwork system (i.e., 100% of the ductwork between an exhaust fan and the grilles served by the fan), the duct-sealing contractor is permitted to perform the duct leakage test. The Rater is not required to witness these tests. Where the duct-sealing contractor is not performing the test on all exhaust ductwork systems, at least 50% of the ductwork in the untested systems, based on linear feet, shall be tested by the Rater according to the requirements in Footnote 56.

ventilation equipment such as motor-driven fans and blowers and related mechanical components such as ducts, inlets, dampers, filters and associated control devices that provides dwelling-unit ventilation at a known or measured airflow rate.

59. Item 7.5 applies to any outdoor air inlet connected to a ducted return of the dwelling unit HVAC system, regardless of its intended purpose (e.g., for ventilation air, make-up air, combustion air). This Item does not apply to HVAC systems without a ducted return.
60. The dwelling-unit ventilation air flows and local exhaust air flows shall be determined and documented by a Rater using ANSI / RESNET / ICC

Overview of Change

- The **testing protocols** have been **updated**
- The allowance for contractors to test at **25 Pa** when using aerosol-based sealing has been **removed**
- **Stay Tuned!** A Rater training video on how to perform the test is under development!



ENERGY STAR

Central Exhaust System
Duct Leakage Testing Protocols

January 2025 | ENERGY STAR for Residential New Construction

Introduction

Item 6.7 of the ENERGY STAR Multifamily New Construction National Rater Field Checklist, Version 1.1 / 1.2 / 1.3 requires duct leakage testing of central exhaust ductwork serving four or more dwelling units, and that the systems meet applicable leakage limits. This document provides testing protocols for this item to ensure that the intent is consistently met.

Figure 1: Photograph of a duct leakage tester set up at roof curb of exhaust riser.

Measuring Duct Leakage of a Central Exhaust System:

To measure duct leakage of central exhaust systems, follow these practices to ensure accurate testing:

- Follow the procedures outlined in the duct leakage tester operation manual for a single point total duct leakage reading in the main duct shaft using a calibrated fan. Unlike total duct leakage testing of typical ducted dwelling-unit mechanical systems, this test may be conducted at 50 Pascals or the design / operating pressure.
- The duct leakage tester is not required to be connected to a specific location in the shaft, however, typical central exhaust duct tightness tests are conducted from the roof with the duct leakage tester connected to the roof curb, as shown in **Figures 1, 2 and 3**. Often, a transition plate, such as cardboard, sheet metal, precut plastic, or similar is needed to effectively seal the duct tester to the roof curb opening.
- Follow the procedures in Section 5.2 of ANSI / RESNET / ICC 380 for preparing the building or dwelling unit and the duct system for testing.

EPA United States Environmental Protection Agency

How to Measure Duct Leakage of Central Exhaust Systems | 1

ENERGY STAR

#10 of 10. HVAC Functional Testing Checklist: **Changes to Functional Testing for shared VRF systems**

Overview of Change

- In Rev.05, the requirements for functional testing of shared VRF systems has been significantly revised:
  - Items 6.1 and 6.2 now **better align** with **manufacturer's recommendations** and **typical commissioning** of large VRF systems serving multiple dwelling units.

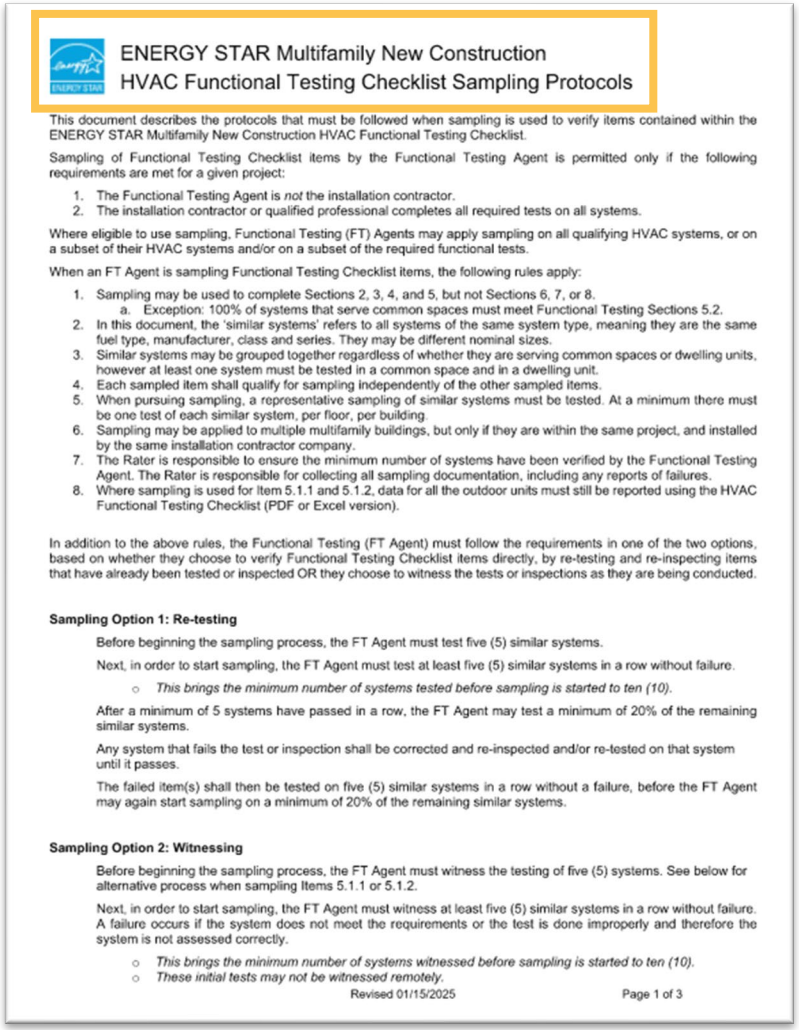
Overview of Change

~~6~~5. **Shared VRF Outdoor Units** - This section must be completed for each commercial-grade VRF outdoor unit~~s~~ serving multiple dwelling units or common spaces, except as allowed by the MFNC HVAC Functional Testing Checklist Sampling Protocols.	FT Agent Verified [1]	N/A
~~6~~5.1 Installation Checks		
~~6~~5.1.1 Pressure testing on refrigerant piping has been completed for this ~~system~~outdoor unit and test out pressure is no less than 95% of the test in pressure after ~~24 hours~~ Error! Reference source not found. (indicate exact test in / test out pressure (psig) / time (hours)): _____ / _____ / _____	-☐	☐
~~6~~5.1.2 Vacuum testing has been completed for this outdoor unit and does not exceed 500 microns after 24 hours.~~"~~ [8] (indicate initial micron gauge reading / final micron gauge reading ~~exact test in / test out pressure~~ (~~psig~~microns) / time (hours)): _____ / _____ / _____	-☐	☐
~~6~~5.1.3 Refrigerant line lengths and height differences ~~have been recorded~~ from as-built shop drawings, original manufacturer's software reports, or field measurement~~sed~~ have been reviewed and the refrigerant charge to be added is based on installed line lengths~~, and documentation of the measurement is available, if requested~~.	☐	☐
~~6~~5.1.4 Indicate required additional charge amount (lbs): _____	-	☐
~~6~~5.2 Functional Testing		
~~6~~5.2.1 In cooling mode, the outdoor unit fan is ON and heat is being rejected. [9,10] Measure and verify that outdoor unit fan discharge air temperature is warmer than the ambient air temperature. N/A due to ambient temperature _____ °F or equipment lock-out ☐	☐	☐
~~6~~5.2.2 In heating mode, the outdoor unit fan is ON and heat is being absorbed. [9,10] Measure and verify that outdoor unit fan discharge air temperature is colder than the ambient air temperature. N/A due to ambient temperature _____ °F or equipment lock-out ☐	☐	☐
~~6~~5.2.3 Using the central maintenance tool or controller, none of the outdoor units or connected indoor units are showing an alarm. Alternatively, none of the thermostats connected to the system have error codes or alarms.	☐	☐
~~6.2.4 Using the central maintenance tool, the manufacturer's representative confirmed refrigerant charge test per manufacturer's guidelines.~~	~~☐~~	~~☐~~

ENERGY STAR

Overview of Change

- A **new sampling option** has been introduced in the **Sampling Protocols**
  - Reduced number of on-site visits by the FTA.
  - Increased documentation review and more rigorous testing by the installing contractor, or another qualified professional.



ENERGY STAR Multifamily New Construction
HVAC Functional Testing Checklist Sampling Protocols

This document describes the protocols that must be followed when sampling is used to verify items contained within the ENERGY STAR Multifamily New Construction HVAC Functional Testing Checklist.

Sampling of Functional Testing Checklist items by the Functional Testing Agent is permitted only if the following requirements are met for a given project:

1. The Functional Testing Agent is *not* the installation contractor.
2. The installation contractor or qualified professional completes all required tests on all systems.

Where eligible to use sampling, Functional Testing (FT) Agents may apply sampling on all qualifying HVAC systems, or on a subset of their HVAC systems and/or on a subset of the required functional tests.

When an FT Agent is sampling Functional Testing Checklist items, the following rules apply:

1. Sampling may be used to complete Sections 2, 3, 4, and 5, but not Sections 6, 7, or 8.
   a. Exception: 100% of systems that serve common spaces must meet Functional Testing Sections 5.2.
2. In this document, the 'similar systems' refers to all systems of the same system type, meaning they are the same fuel type, manufacturer, class and series. They may be different nominal sizes.
3. Similar systems may be grouped together regardless of whether they are serving common spaces or dwelling units, however at least one system must be tested in a common space and in a dwelling unit.
4. Each sampled item shall qualify for sampling independently of the other sampled items.
5. When pursuing sampling, a representative sampling of similar systems must be tested. At a minimum there must be one test of each similar system, per floor, per building.
6. Sampling may be applied to multiple multifamily buildings, but only if they are within the same project, and installed by the same installation contractor company.
7. The Rater is responsible to ensure the minimum number of systems have been verified by the Functional Testing Agent. The Rater is responsible for collecting all sampling documentation, including any reports of failures.
8. Where sampling is used for Item 5.1.1 and 5.1.2, data for all the outdoor units must still be reported using the HVAC Functional Testing Checklist (PDF or Excel version).

In addition to the above rules, the Functional Testing (FT Agent) must follow the requirements in one of the two options, based on whether they choose to verify Functional Testing Checklist items directly, by re-testing and re-inspecting items that have already been tested or inspected OR they choose to witness the tests or inspections as they are being conducted.

Sampling Option 1: Re-testing

Before beginning the sampling process, the FT Agent must test five (5) similar systems.

Next, in order to start sampling, the FT Agent must test at least five (5) similar systems in a row without failure.

- *This brings the minimum number of systems tested before sampling is started to ten (10).*

After a minimum of 5 systems have passed in a row, the FT Agent may test a minimum of 20% of the remaining similar systems.

Any system that fails the test or inspection shall be corrected and re-inspected and/or re-tested on that system until it passes.

The failed item(s) shall then be tested on five (5) similar systems in a row without a failure, before the FT Agent may again start sampling on a minimum of 20% of the remaining similar systems.

Sampling Option 2: Witnessing

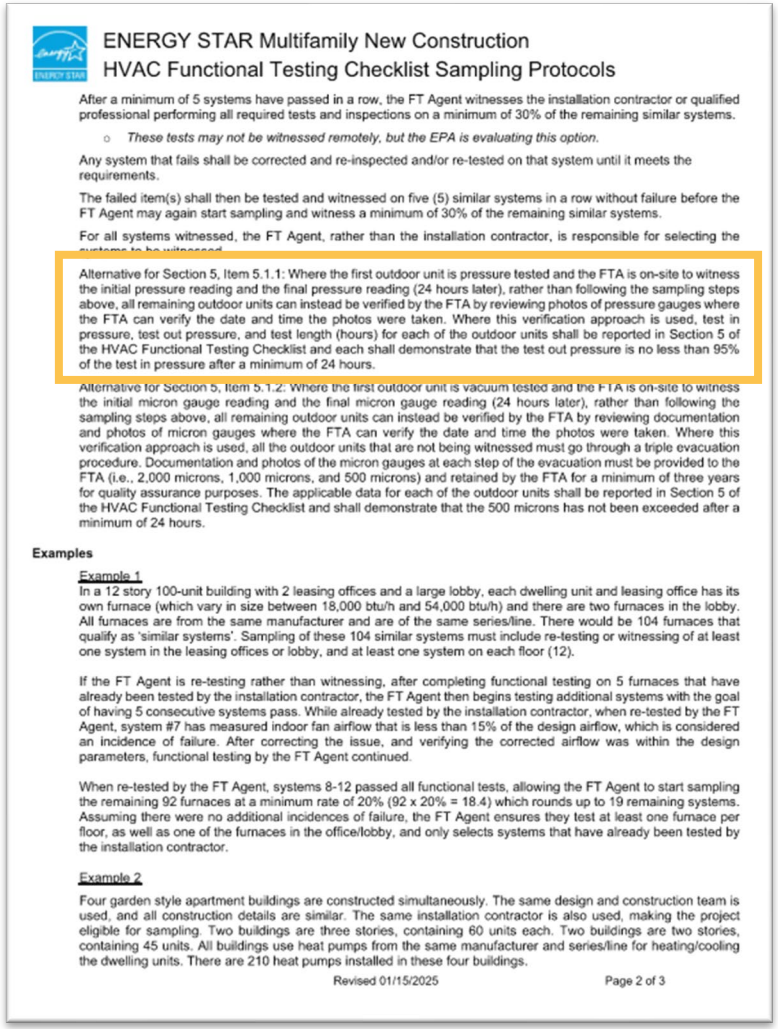
Before beginning the sampling process, the FT Agent must witness the testing of five (5) systems. See below for alternative process when sampling Items 5.1.1 or 5.1.2.

Next, in order to start sampling, the FT Agent must witness at least five (5) similar systems in a row without failure. A failure occurs if the system does not meet the requirements or the test is done improperly and therefore the system is not assessed correctly.

- *This brings the minimum number of systems witnessed before sampling is started to ten (10).*
- *These initial tests may not be witnessed remotely.*

Revised 01/15/2025 Page 1 of 3

Overview of Change



ENERGY STAR Multifamily New Construction
HVAC Functional Testing Checklist Sampling Protocols

After a minimum of 5 systems have passed in a row, the FT Agent witnesses the installation contractor or qualified professional performing all required tests and inspections on a minimum of 30% of the remaining similar systems.

- *These tests may not be witnessed remotely, but the EPA is evaluating this option.*

Any system that fails shall be corrected and re-inspected and/or re-tested on that system until it meets the requirements.

The failed item(s) shall then be tested and witnessed on five (5) similar systems in a row without failure before the FT Agent may again start sampling and witness a minimum of 30% of the remaining similar systems.

For all systems witnessed, the FT Agent, rather than the installation contractor, is responsible for selecting the systems to be witnessed.

Alternative for Section 5, Item 5.1.1: Where the first outdoor unit is pressure tested and the FTA is on-site to witness the initial pressure reading and the final pressure reading (24 hours later), rather than following the sampling steps above, all remaining outdoor units can instead be verified by the FTA by reviewing photos of pressure gauges where the FTA can verify the date and time the photos were taken. Where this verification approach is used, test in pressure, test out pressure, and test length (hours) for each of the outdoor units shall be reported in Section 5 of the HVAC Functional Testing Checklist and each shall demonstrate that the test out pressure is no less than 95% of the test in pressure after a minimum of 24 hours.

Alternative for Section 5, Item 5.1.2: Where the first outdoor unit is vacuum tested and the FTA is on-site to witness the initial micron gauge reading and the final micron gauge reading (24 hours later), rather than following the sampling steps above, all remaining outdoor units can instead be verified by the FTA by reviewing documentation and photos of micron gauges where the FTA can verify the date and time the photos were taken. Where this verification approach is used, all the outdoor units that are not being witnessed must go through a triple evacuation procedure. Documentation and photos of the micron gauges at each step of the evacuation must be provided to the FTA (i.e., 2,000 microns, 1,000 microns, and 500 microns) and retained by the FTA for a minimum of three years for quality assurance purposes. The applicable data for each of the outdoor units shall be reported in Section 5 of the HVAC Functional Testing Checklist and shall demonstrate that the 500 microns has not been exceeded after a minimum of 24 hours.

Examples

Example 1
In a 12 story 100-unit building with 2 leasing offices and a large lobby, each dwelling unit and leasing office has its own furnace (which vary in size between 18,000 btu/h and 54,000 btu/h) and there are two furnaces in the lobby. All furnaces are from the same manufacturer and are of the same series/line. There would be 104 furnaces that qualify as 'similar systems'. Sampling of these 104 similar systems must include re-testing or witnessing of at least one system in the leasing offices or lobby, and at least one system on each floor (12).

If the FT Agent is re-testing rather than witnessing, after completing functional testing on 5 furnaces that have already been tested by the installation contractor, the FT Agent then begins testing additional systems with the goal of having 5 consecutive systems pass. While already tested by the installation contractor, when re-tested by the FT Agent, system #7 has measured indoor fan airflow that is less than 15% of the design airflow, which is considered an incidence of failure. After correcting the issue, and verifying the corrected airflow was within the design parameters, functional testing by the FT Agent continued.

When re-tested by the FT Agent, systems 8-12 passed all functional tests, allowing the FT Agent to start sampling the remaining 92 furnaces at a minimum rate of 20% (92 x 20% = 18.4) which rounds up to 19 remaining systems. Assuming there were no additional incidences of failure, the FT Agent ensures they test at least one furnace per floor, as well as one of the furnaces in the office/lobby, and only selects systems that have already been tested by the installation contractor.

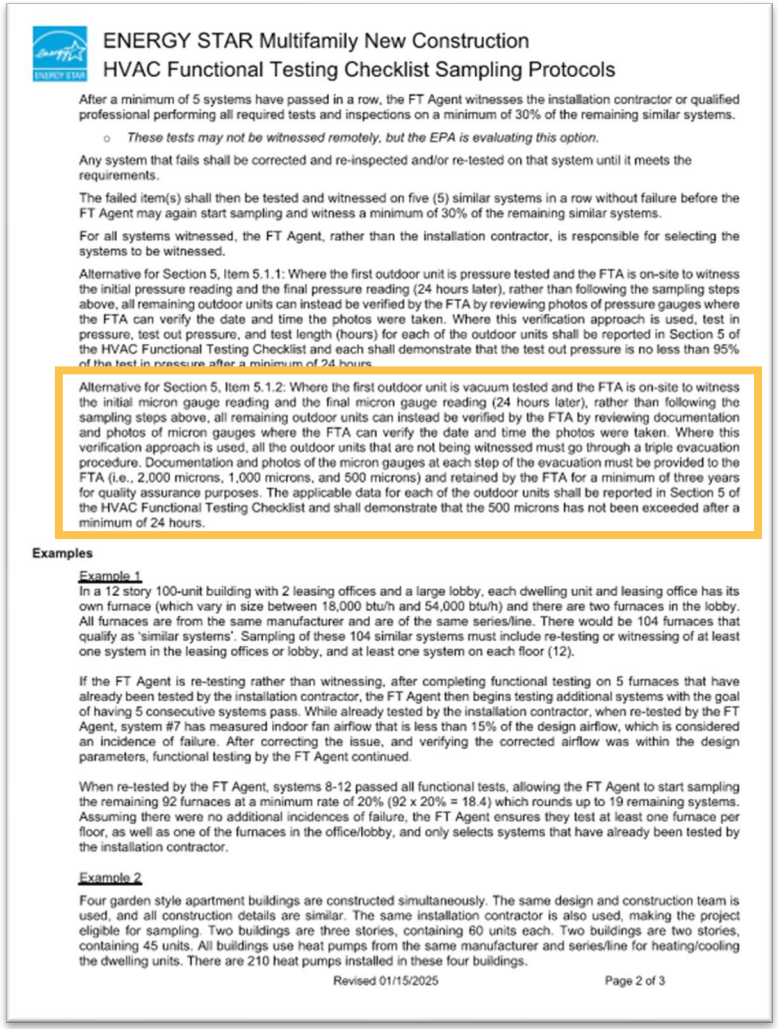
Example 2
Four garden style apartment buildings are constructed simultaneously. The same design and construction team is used, and all construction details are similar. The same installation contractor is also used, making the project eligible for sampling. Two buildings are three stories, containing 60 units each. Two buildings are two stories, containing 45 units. All buildings use heat pumps from the same manufacturer and series/line for heating/cooling the dwelling units. There are 210 heat pumps installed in these four buildings.

Revised 01/15/2025 Page 2 of 3

- New Alternative for Section 5, Item 5.1.1:
  - Where the first outdoor unit is pressure tested, **AND**
  - FTA is on-site to **witness the initial pressure** reading and the **final pressure** reading (24 hours later), then
  - All remaining outdoor units can be verified by the FTA by **reviewing photos of pressure gauges.**

- **Data** for **each** of the outdoor units must be reported in the HVAC Functional Testing Checklist, **AND**
- Each outdoor unit shall demonstrate that the test out pressure is no less than 95% of the test in pressure after a minimum of 24 hours.

Overview of Change



ENERGY STAR Multifamily New Construction
HVAC Functional Testing Checklist Sampling Protocols

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- *These tests may not be witnessed remotely, but the EPA is evaluating this option.*

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Alternative for Section 5, Item 5.1.2: Where the first outdoor unit is vacuum tested and the FTA is on-site to witness the initial micron gauge reading and the final micron gauge reading (24 hours later), rather than following the sampling steps above, all remaining outdoor units can instead be verified by the FTA by reviewing documentation and photos of micron gauges where the FTA can verify the date and time the photos were taken. Where this verification approach is used, all the outdoor units that are not being witnessed must go through a triple evacuation procedure. Documentation and photos of the micron gauges at each step of the evacuation must be provided to the FTA (i.e., 2,000 microns, 1,000 microns, and 500 microns) and retained by the FTA for a minimum of three years for quality assurance purposes. The applicable data for each of the outdoor units shall be reported in Section 5 of the HVAC Functional Testing Checklist and shall demonstrate that the 500 microns has not been exceeded after a minimum of 24 hours.

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Example 2
Four garden style apartment buildings are constructed simultaneously. The same design and construction team is used, and all construction details are similar. The same installation contractor is also used, making the project eligible for sampling. Two buildings are three stories, containing 60 units each. Two buildings are two stories, containing 45 units. All buildings use heat pumps from the same manufacturer and series/line for heating/cooling the dwelling units. There are 210 heat pumps installed in these four buildings.

Revised 01/15/2025 Page 2 of 3

- New Alternative for Section 5, Item 5.1.2:
  - Where the first outdoor unit is vacuum tested, **AND**
  - FTA is on-site to **witness the initial micron gauge** reading and the **final micron gauge** reading (24 hours later), then
  - All remaining outdoor units can be verified by the FTA by **reviewing photos of micron gauges.**

- Where this alternative is used, **all** the outdoor units that are **not being witnessed** must go through a **triple evacuation** procedure and like prior slide, be documented in the Checklist.

Non-Change: Track B – HVAC Functional Testing by Agent **May Still be Used**

Background

- Program currently has two compliance tracks for completing HVAC design and functional testing requirements:
  - Track A: HVAC Grading by Rater
  - Track B: HVAC Functional Testing by Agent
- Track B was proposed to be sunset for buildings permitted on or after 1/1/2026.
- Based on partner feedback, this change will not be made.
- The EPA will continue to build capacity to use Track A and may consider more incremental steps to prepare for the eventual sunset of Track B.

Smaller changes, clarifications, and refinements

Reorganization

#1 of 8. Rater Design Review Checklist
Consolidate Items 2.1 and 2.2, narrow scope of Item 2.1 to address only SHGC & Remove SHGC requirement for CZ 4C - 8

Rev. 04

2. High-Performance Fenestration Specified fenestration meets or exceeds the levels in Items 2.1 and 2.2 based on location, Path, and the program version used to certify the building. [7]
2.1 Dwelling units:
2.1.1 Prescriptive: ENERGY STAR MF Reference Design requirements.
2.1.2 ERI and ASHRAE only: 2009 IECC or, for National v1.2, 2021 IECC residential requirements. [8]
2.2 Common space: [2]
2.2.1 ERI and Prescriptive: ENERGY STAR MF Reference Design requirements for Class AW windows.
2.2.2 ASHRAE only: 2009 IECC or, for National v1.2, 2021 IECC commercial requirements. [8]

Rev. 05

2.2 In CZ 1-3, 4A, and 4B, specified windows, skylights, and doors that are ≥ 50% glazed achieve the area-weighted average SHGC described in Footnote 11 and 13 and are documented through ERI energy modeling or in the Multifamily Workbook. [7, 13]

Items 2.1 and 2.2 become Item 2.2

SHGC requirement removed from CZ 4C - 8

Footnote Tables describe SHGC

Scope narrowed to SHGC only

Compliance documented in software or MF Workbook

- Item 2.1 and 2.2 are combined and become Item 2.2 in Revision 05.
- The scope is narrowed to SHGC only, with details in Footnote. Fenestration U-factor is still considered as part of the thermal backstop.
- The SHGC requirements are removed for CZ 4C – 8.
- Compliance must be documented through ERI software or the Multifamily Workbook.

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Items 3.1 and 3.2 becomes Item 2.1

Compliance documented in software or MF Workbook

Rev. 04

3.1 Dwelling unit:
3.1.1 Prescriptive: ENERGY STAR MF Reference Design requirements.
3.1.2 ERI & ASHRAE only: Either the Residential chapter or the "Group R" column in the Commercial chapter of the 2009 IECC or, for National v1.2, the 2021 IECC. See exceptions in Footnote 11. [8, 14]
3.2 Common space: [2] Either the Residential chapter or the "All Other" column in the Commercial chapter of the 2009 IECC, or for National v1.2 the 2021 IECC. See exceptions in Footnote 11. [8, 14]

Rev. 05

2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [7, 8, 9, 10, 11, 12, 13]

Footnote tables describe UA requirements

- Items 3.1 and 3.2 are combined and become Item 2.1 in Revision 05.
- Requirements are in Footnotes and reference Total UA (or TC for National v1.3).
- Compliance must be documented through ERI software or the Multifamily Workbook.

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 04

Table 1: All Versions except National v1.2:

	Residential dwelling unit doors and windows (i.e., not classified "Class AW"*)	Structural dwelling unit windows and doors that are classified as "Class AW"* and all skylights	Common Space †
ERI	2009 IECC Table 402.1.1 [8]	2009 IECC Table 502.3 [8]	ENERGY STAR MF Reference Design – for Class AW
ASHRAE	2009 IECC Table 402.1.1 [8]	2009 IECC Table 502.3 [8]	2009 IECC Table 502.3 [8]
Prescriptive	ENERGY STAR MF Reference Design	Windows and Doors: ENERGY STAR MF Reference Design – for Class AW Skylights: 2012 IECC Table 402.3 [8]	ENERGY STAR MF Reference Design – for Class AW

Table 3: All Versions Except National v1.2:

	Dwelling Unit Options		Common Space Options	
ERI and ASHRAE	2009 IECC Residential Chapter†	2009 IECC Commercial Chapter "Group R" Column	2009 IECC Residential Chapter†	2009 IECC Commercial Chapter "All Other" Column
Prescriptive	ENERGY STAR MF Reference Design			

Prior to Revision 05, each Version had one table for opaque assemblies and one for fenestration

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 05

Each Version has one table with the total building enclosure requirements.

2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [7, 8, 9, 10, 11, 12, 13]

11. For all Versions except National v1.2 and National v1.3, the total building thermal envelope UA (i.e., accounting for ceilings, walls, floors, slabs, and fenestration) shall be less than or equal to the thermal backstop target in Table 1 resulting from multiplying the U-factors specified in Table 1 by the same assembly area as the building to be certified.

For National v1.2, the total building thermal envelope UA (i.e., accounting for ceilings, walls, floors, slabs, and fenestration) shall be less than or equal to the thermal backstop target in Table 2 resulting from multiplying assembly U-factors specified in Table 2 by the same assembly area as the building to be certified. For buildings permitted before 01/01/2025 and following the ERI or ASHRAE Path only, the thermal backstop target shall be less than or equal to 105% of the total UA resulting from multiplying the U-factors in Table 2 by the same assembly area as the building to be certified.

For National v1.3, the total building thermal envelope TC shall be less than or equal to the thermal backstop target in Table 3 resulting from using the assembly factors specified in Table 3 and using Equation 4-1 of the 2024 IECC.

Where noted in Table 1, 2 and 3, the term "classified as "Class AW"' indicates windows that are classified as such under the North American Fenestration Standard (AAMA / WDMA / CSA 101 / I.S.2 / A440).

ENERGY STAR

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 05

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC Table 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC Table 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.2	2009 IECC 502.3	2009 IECC 502.3
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			

- Opaque Assemblies and Fenestration tables are combined.
- Residential and Commercial options are listed by Path.
- Thermal backstop target is added to the table.

ENERGY STAR

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 05

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC Table 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC Table 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.2	2009 IECC 502.3	2009 IECC 502.3
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			

- Opaque Assemblies and Fenestration tables are combined.
- Residential and Commercial options are listed by Path.
- Thermal backstop target is added to the table.

ENERGY STAR

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 05

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC Table 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC Table 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.2	2009 IECC 502.3	2009 IECC 502.3
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			

- Opaque Assemblies and Fenestration tables are combined.
- Residential and Commercial options are listed by Path.
- Thermal backstop target is added to the table.

ENERGY STAR

#2 of 8. Rater Design Review Checklist
Thermal enclosure backstop based on UA calculation

Rev. 05

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC Table 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC Table 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, C[illegible]	≤ 100% of total UA	2009 IECC 502.1.2	2009 IECC 502.1.2			
[illegible]						
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column	2009 IECC 402.1.2	2009 IECC 502.3	2009 IECC 502.3

iii. Where using the Multifamily Workbook to document compliance, assemblies may alternatively meet the U-factor or F-Factor by building component rather than using the total UA or TC approach.

12. The calculations shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

    Where documenting UA within the workbook, F-factors and slab perimeter lengths will be used in place of U-factors and areas.

    The following exceptions apply:

    i. When referencing the 2009 IECC Commercial chapter, buildings in Climate Zone 4 and Climate Zone 5/Marine 4 may use U-0.089 and U-0.064 respectively for Group R wood-framed walls instead of the printed U-0.064 and U-0.051.

    ii. In jurisdictions designated by a code official as having Very Heavy Termite Infestation, the total UA limit shall be calculated by replacing the code-required slab insulation R-value and depth with the slab insulation R-value and depth specified in the building to be certified.

    iii. Where using the Multifamily Workbook to document compliance, assemblies may alternatively meet the U-factor or F-Factor by building component rather than using the total UA or TC approach.

    iv. The thermal backstop may be met through meeting the Residential option for dwelling units and the Commercial option for common spaces. It is not permitted to choose the Residential chapter for one building component for dwelling units and the Commercial chapter for another building component for dwelling units.

#3 of 8. Rater Design Review Checklist
Opaque doors included in opaque assemblies

Rev. 05

Table 1: For all Versions except National v1.2 and National v1.3:

Options by Path	Thermal Backstop Target	Opaque Assemblies (including opaque doors and opaque spandrel panels)		Fenestration (including fully & partially glazed doors and skylights)		
		Dwelling Units	Common Spaces	Residential dwelling unit doors and windows (i.e., not classified "Class AW")	Structural dwelling unit windows and doors that are classified as "Class AW" and all skylights	Common Space
Prescriptive, Residential Option	≤ 100% of total UA	ENERGY STAR MF Reference Design	2009 IECC Table 402.1.3	ENERGY STAR MF Reference Design	Windows and Doors ENERGY STAR MF Reference Design for "Class AW" Skylights 2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
Prescriptive, Commercial Option	≤ 100% of total UA		2009 IECC Table 502.1.2 "All Other" Column			
ERI, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 502.3	ENERGY STAR MF Reference Design for "Class AW"
ERI, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			
ASHRAE, Residential Option	≤ 100% of total UA	2009 IECC 402.1.3	2009 IECC 402.1.3	2009 IECC 402.1.2	2009 IECC 502.3	2009 IECC 502.3
ASHRAE, Commercial Option	≤ 100% of total UA	2009 IECC 502.1.2 "Group R" Column	2009 IECC 502.1.2 "All Other" Column			

- Added opaque doors as part of opaque assemblies.
- Clarified opaque spandrel panels covered by opaque assemblies.

#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- With the updated Section 3, requirement is only to assess whether there is a thermal break at the concrete floor edge.

#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- With the updated Section 3, requirement is only to assess whether there is a thermal break at the concrete floor edge.
- In CZ 4-8, where no thermal break is in place, the following applies:
  - In the energy model, the floor edge must have R-0.
  - A UA penalty is required. The following modified U-factors must be used in the Multifamily Workbook for the vertical area of the concrete floor edge to account for the thermal bridge:
    - Where the floor is above conditioned space, use U-1.20.
    - Where the floor is above unconditioned space, use U-1.64.
  - The uninsulated floor edge will be compared to an insulated mass wall.

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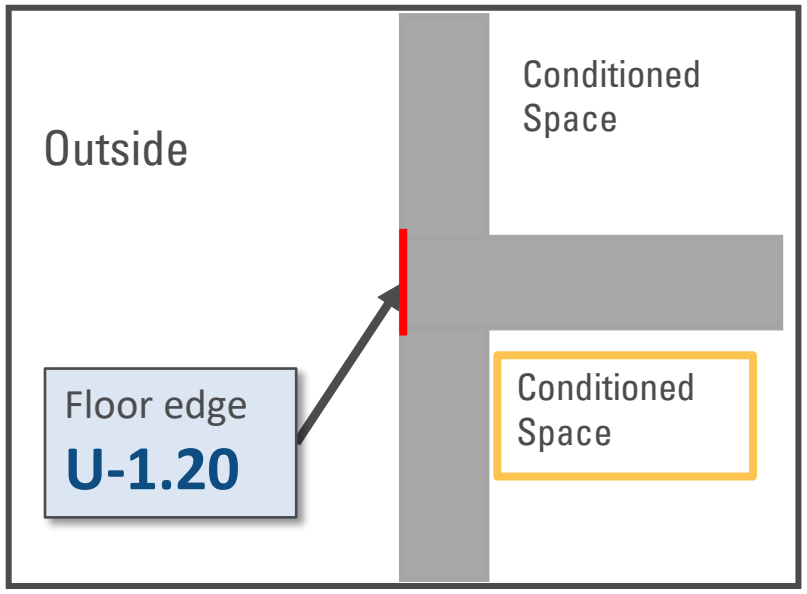
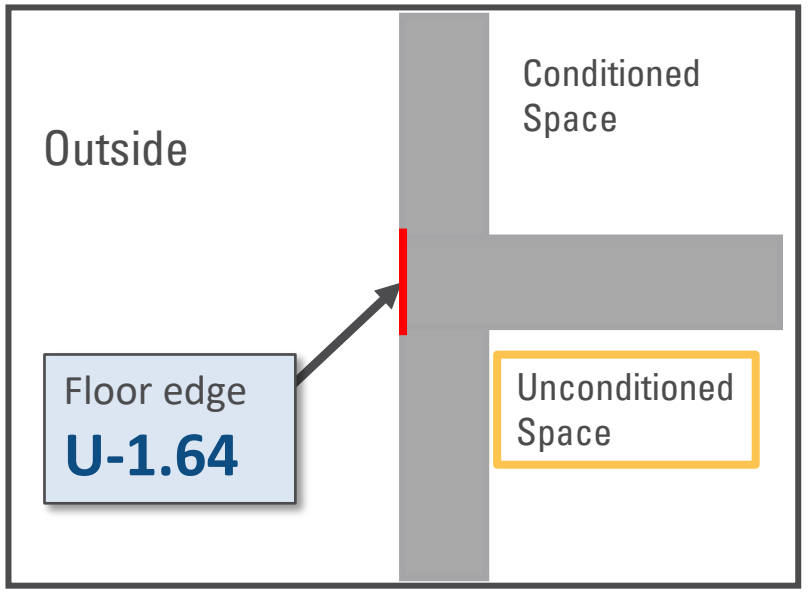
#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- The following modified U-factors must be used in the Multifamily Workbook for the vertical area of the concrete floor edge to account for the thermal bridge.

Floor Above Conditioned Space



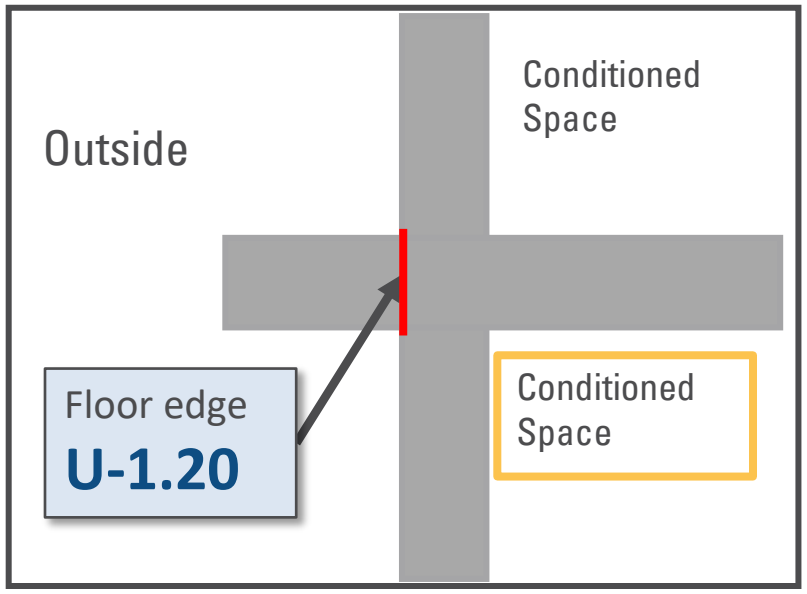
Floor Above Unconditioned Space



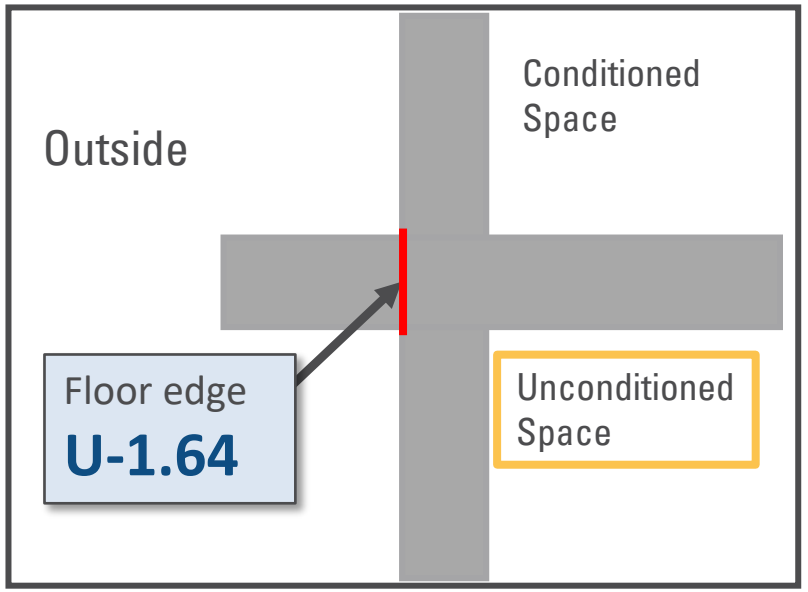
#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- The following modified U-factors must be used in the Multifamily Workbook for the vertical area of the concrete floor edge to account for the thermal bridge.

Floor Above Conditioned Space



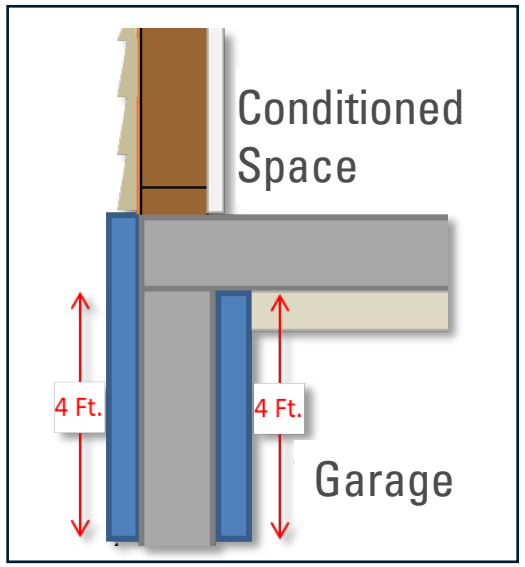
Floor Above Unconditioned Space

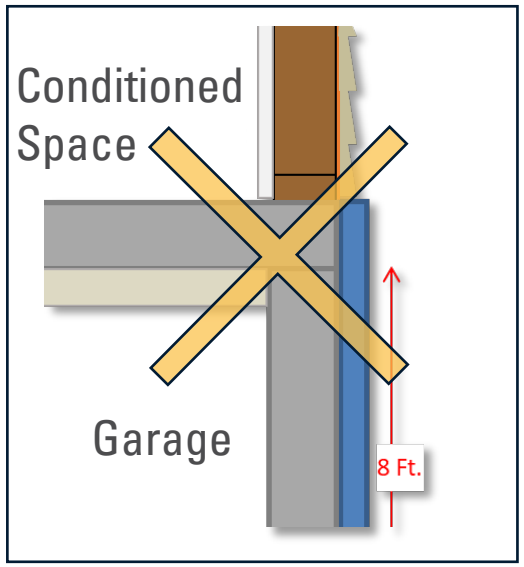


#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- Where there is a thermal break in CZ 4-8, then the U-factor for the floor edge must be calculated based on the insulation installed at the floor edge.
- This assembly U-factor must be used in both the model and Multifamily Workbook for the floor edge area.

Thermal Break Examples

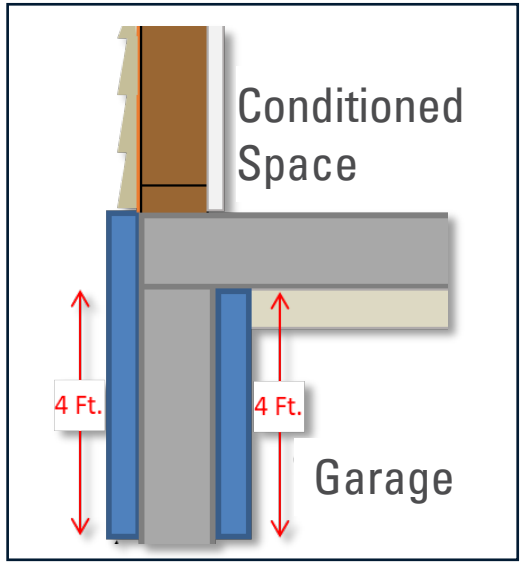


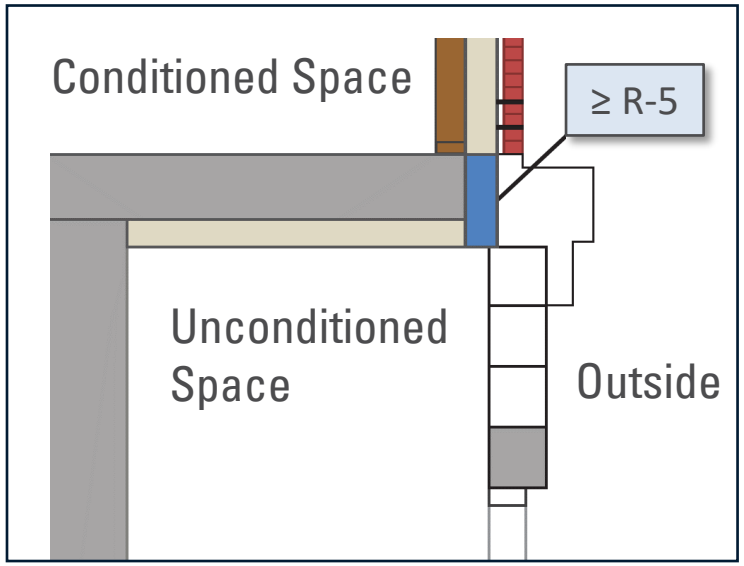


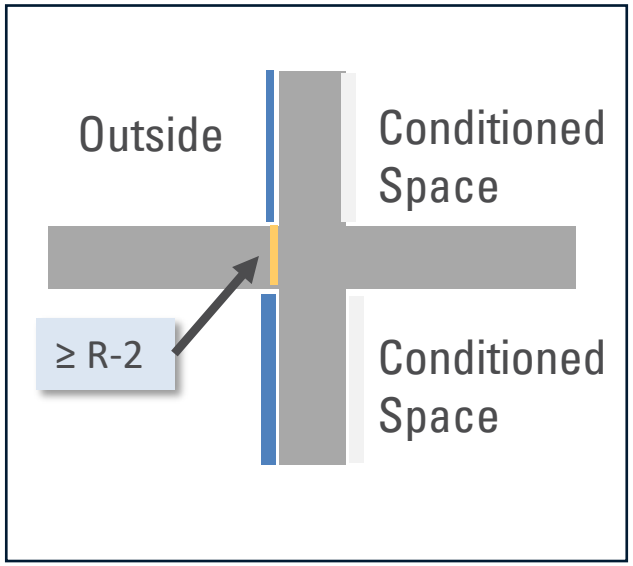
#4 of 8. National Rater Field Checklist
Thermal break for concrete floor edges

- Where there is a thermal break in CZ 4-8, then the U-factor for the floor edge must be calculated based on the insulation installed at the floor edge.
- This assembly U-factor must be used in both the model and Multifamily Workbook for the floor edge area.

Thermal Break Examples







#5 of 8. National Rater Field Checklist: **Functional testing of indoor units moved to National Rater Field Checklist**

- Prior to Rev. 05, Functional Testing of indoor units (Section 5) was included on the National HVAC Functional Testing Checklist, but could be verified by Raters or FTAs.
- To streamline verification for Raters, the functional testing of indoor units was moved to the National Rater Field Checklist in Revision 05.

#5 of 8. National Rater Field Checklist: **Functional testing of indoor units moved to National Rater Field Checklist**

Rev. 04 – HVAC Functional Testing Checklist

ENERGY STAR Multifamily New Construction

National HVAC Functional Testing Checklist [1], Version 1 / 1.1 /1.2 (Rev.04)

3. Indoor HVAC Fan Airflow - This section must be completed for split air conditioners, unitary air conditioners, air-source heat pumps (including multi-splits), and water-source (i.e., geothermal or water-loop) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts) and to furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts), whether serving dwelling units or other common spaces in the building. Mini-splits, ducted or non-ducted, are exempt; however, multi-split systems such as shared VRF systems, where indoor HVAC fans with forced-air distribution are connected to a shared outdoor unit that exceeds 65 kBtuh, are not exempt. [5]	**FT Agent Verified** [1]	**N/A**
3.1 The mode with the higher design HVAC fan airflow used, per Item 5.2 of National HVAC Design Report: ☐ Heating ☐ Cooling	☐	-
3.2 Static pressure test holes have been created, and test hole locations are well-marked and accessible.	☐	-
Test hole location for **return** external static pressure: ☐ Plenum ☐ Cabinet ☐ Transition ☐ Other: _____	-	-
Test hole location for **supply** external static pressure: ☐ Plenum ☐ Cabinet ☐ Transition ☐ Other: _____	-	-
3.3 Measured **return** external static pressure (Enter value only, without negative sign): _____ IWC	-	-
3.4 Measured **supply** external static pressure (Enter value only, without positive sign): _____ IWC	-	-
3.5 Measured **total** external static pressure = Value-only from Item 3.3 + Value-only from Item 3.4 = _____ IWC	-	-
3.6 **Measured** (Item 3.5) - **Design** (Item 5.2 on National HVAC Design Report) total external static pressure = _____IWC	-	-
3.7 Measured HVAC fan airflow, using Item 3.5 and fan speed setting: _____CFM	-	-
3.8 Measured HVAC fan airflow (Item 3.7) is ± 15% of design HVAC fan airflow (Item 5.2 on National HVAC Design Report).	☐	-

4. Air Balancing of Supply Registers & Return Grilles (Recommended, but not Required) [6]	**Rater Verified**	**FT Agent Verified** [1]	**N/A**
4.1 Balancing report attached with room-by-room design airflows from Item 5.2 on National HVAC Design Report, and contractor-measured airflow using ANSI / ACCA 5 QI-2015 protocol.	☐	☐	☐
4.2 Room-by-room airflows verified to be within the greater of ± 20% or 25 CFM of design airflow.	☐	☐	☐

5. Functional Testing: Indoor / Terminal Units - This section must be completed for all heating and cooling equipment located within dwelling units or common spaces, including systems identified in Sections 2 and 3, except where specifically noted. Indoor / terminal units include, but are not limited to, mini-splits, multi-splits, PTAC's, PTHP's, WLHP's, fan coils, and hydronic distribution systems. [5]	**Rater Verified**	**FT Agent Verified** [1]	**N/A**
5.1 Installation Checks			
5.1.1 Zone thermostat (or remote zone temperature sensor) in dwelling units, within the zone being served.	☐	☐	☐
5.2 Functional Testing			
5.2.1 Measured zone temperature is within 5°F of zone temperature displayed on thermostat or sensor.	☐	☐	☐
5.2.2 System turns on when there is a call for heat and heating is provided. System turns off when the heating setpoint has been met. [7]	☐	☐	☐
If N/A, select the reason: ☐ due to high ambient temperature OR ☐ equipment lock-out	-	-	-
5.2.3 System turns on when there is a call for cooling and cooling is provided. System turns off when the cooling setpoint has been met. [7]	☐	☐	☐
If N/A, select the reason: ☐ due to low ambient temperature OR ☐ equipment lock-out	-	-	-
5.2.4 Where OA inlets are connected to the dwelling unit HVAC system, a motorized damper is installed that closes when there is no call for ventilation or when fan is off.	☐	☐	☐

Rev. 05 – Rater Field Checklist

ENERGY STAR Multifamily New Construction

National Rater Field Checklist [1], Version 1.1 / 1.2 / 1.3 (Rev. 05)

4. Air Sealing (cont.)	**Must Correct**	**Builder Verified** [3]	**Rater Verified** [4]	**N/A** [5]
4.3 Recessed lighting fixtures are ICAT labeled and gasketed.	☐	No limit ☐	☐	☐
4.4 Drywall is sealed to top plate during installation, or from the attic side at all unconditioned attic / wall interfaces. Drywall adhesive (but not other construction adhesives), is permitted to be used.	☐	No limit ☐	☐	☐
4.5 Rough opening around windows & exterior doors is sealed.	☐	-	☐	-
4.6 Assemblies that separate attached garages from occupiable space are sealed. In addition, an air barrier is installed, sealed, and aligned with these assemblies. [31]	☐	-	☐	☐
4.7 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions are made substantially air-tight with door seal and weatherstripping or equivalent gasket.	☐	-	☐	☐
The following items must be additionally verified in dwelling units, to reduce air leakage between conditioned spaces.				
4.8 Doors serving as a unit entrance from a corridor/stairwell made substantially air-tight with door seal and weatherstripping or equivalent gasket.	☐	-	☐	☐
4.9 Rater-measured air leakage meets the following CFM50 per sq. ft. of Dwelling Unit Compartmentalization Boundary: [32, 33] For all Versions and Paths except National v1.3, Prescriptive Path: ≤ 0.30 CFM50 For National v1.3, Prescriptive Path: ≤ 0.27 CFM50	☐	-	☐	-
4.9.1 For dwelling units with forced air distribution systems without ducted returns and air handlers located in a closet or space adjacent to unconditioned space, the Rater-measured pressure difference between the space containing the air handler and the conditioned space during the compartmentalization test is no greater than 5 Pa. [34]	☐	-	☐	☐

HVAC System [35]		**Must Correct**	**Rater Verified** [4]	**N/A** [5]
5. Heating & Cooling Eqpt. Complete Track A - HVAC Grading by Rater[36] or Track B - HVAC Testing by FT Agent[37]				
Track A	5a.1 Blower fan volumetric airflow is Grade I or II per ANSI / RESNET / ACCA 310.	☐	☐	☐
	5a.2 Blower fan watt draw is Grade I or II per ANSI / RESNET / ACCA 310.	☐	☐	☐
	5a.3 Refrigerant charge is Grade I per ANSI / RESNET / ACCA 310. See Footnote 38 for exemptions.	☐	☐	☐
	5a.4 HVAC manufacturer & model number on installed equipment matches the HVAC Design Report in compliance with ANSI / RESNET / ACCA 310 or the HVAC Design Supplement to Std. 310 for Common Spaces and Central Systems. [39]	☐	☐	☐
Track B	5b.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box):[40] ☐ National HVAC Design Report (4.6-4.9 & 4.25-4.26) ☐ Written approval received from designer	☐	☐	-
	5b.2 External static pressure measured by Rater at contractor-provided test locations and documented below: [41] Dwelling Unit / Common Space Served: _____ Return-Side External Static Pressure: _____ IWC Supply-Side External Static Pressure: _____ IWC	☐	☐	☐
5.5 Prescriptive Path: Heating and cooling equipment serving dwelling units, common spaces, and garages meet the efficiency levels specified in the ENERGY STAR Multifamily Reference Design. Electric resistance space heating is not installed in dwelling units. [42]		☐	☐	☐
5.6 ERI Path: Heating and cooling equipment serving common spaces and garages, but not serving dwelling units, meet the efficiency levels specified in the ENERGY STAR Multifamily Reference Design. See Footnote 42 for restrictions on electric resistance space heating. [42]		☐	☐	☐
5.7 National HVAC Functional Testing Checklist(s) collected prior to certification, with all HVAC systems in the building fully documented. Exception: Where credentialed HVAC Contractor(s) are completing the National HVAC Functional Testing Checklist, the checklist is not required to be collected for the systems they verify. [43]		☐	☐	☐
5.8 Rater has verified and documented that Functional Testing Agent(s) (FT Agent(s)) completing the National HVAC Functional Testing Checklist(s) hold one of the required credentials and completed orientation, if applicable. [43] Credential(s): _____ FT Agent Name(s): _____		☐	☐	☐

Equipment Controls	**Must Correct**	**LP Verified**[44]	**Rater Verified** [4]	**N/A** [5]
5.9 All heating and cooling systems serving a dwelling unit have thermostatic controls within the dwelling unit.	☐	-	☐	☐
5.10 For all indoor / terminal units in dwelling units and common spaces: [45]				
5.10.1 Measured zone temperature is within 5°F of zone temperature displayed on thermostat or sensor.	☐	-	☐	☐
5.10.2 System turns on when there is a call for heat and heating is provided. System turns off when the heating setpoint has been met. If N/A, select the reason: ☐ due to high ambient temperature OR ☐ equipment lock-out	☐	-	☐	☐
5.10.3 System turns on when there is a call for cool and cooling is provided. System turns off when the cooling setpoint has been met. If N/A, select the reason: ☐ due to high ambient temperature OR ☐ equipment lock-out	☐	-	☐	☐

#5 of 8. National Rater Field Checklist: **Functional testing of indoor units moved to National Rater Field Checklist**

Rev. 04 – HVAC Functional Testing Checklist

ENERGY STAR Multifamily New Construction

National HVAC Functional Testing Checklist [1], Version 1 / 1.1 /1.2 (Rev.04)

3. Indoor HVAC Fan Airflow - This section must be completed for split air conditioners, unitary air conditioners, air-source heat pumps (including multi-splits), and water-source (i.e., geothermal or water-loop) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts) and to furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts), whether serving dwelling units or other common spaces in the building. Mini-splits, ducted or non-ducted, are exempt; however, multi-split systems such as shared VRF systems, where indoor HVAC fans with forced-air distribution are connected to a shared outdoor unit that exceeds 65 kBtuh, are not exempt. [5]		**FT Agent Verified [1]**	**N/A**
3.1 The mode with the higher design HVAC fan airflow used, per Item 5.2 of National HVAC Design Report: ☐ Heating ☐ Cooling		☐	-
3.2 Static pressure test holes have been created, and test hole locations are well-marked and accessible.		☐	-
Test hole location for **return** external static pressure: ☐ Plenum ☐ Cabinet ☐ Transition ☐ Other: _____		-	-
Test hole location for **supply** external static pressure: ☐ Plenum ☐ Cabinet ☐ Transition ☐ Other: _____		-	-
3.3 Measured **return** external static pressure (Enter value only, without negative sign): _____ IWC		-	-
3.4 Measured **supply** external static pressure (Enter value only, without positive sign): _____ IWC		-	-
3.5 Measured **total** external static pressure = Value-only from Item 3.3 + Value-only from Item 3.4 = _____ IWC		-	-
3.6 **Measured** (Item 3.5) - **Design** (Item 5.2 on National HVAC Design Report) total external static pressure = _____IWC		-	-
3.7 Measured HVAC fan airflow, using Item 3.5 and fan speed setting: _____CFM		-	-
3.8 Measured HVAC fan airflow (Item 3.7) is ± 15% of design HVAC fan airflow (Item 5.2 on National HVAC Design Report).		☐	-
4. Air Balancing of Supply Registers & Return Grilles (Recommended, but not Required) [6]	**Rater Verified**	**FT Agent Verified[1]**	**N/A**
4.1 Balancing report attached with room-by-room design airflows from Item 5.2 on National HVAC Design Report, and contractor-measured airflow using ANSI / ACCA 5 QI-2015 protocol.	☐	☐	☐
4.2 Room-by-room airflows verified to be within the greater of ± 20% or 25 CFM of design airflow.	☐	☐	☐
5. Functional Testing: Indoor / Terminal Units - This section must be completed for all heating and cooling equipment located within dwelling units or common spaces, including systems identified in Sections 2 and 3, except where specifically noted. Indoor / terminal units include, but are not limited to, mini-splits, multi-splits, PTAC's, PTHP's, WLHP's, fan coils, and hydronic distribution systems. [5]	**Rater Verified**	**FT Agent Verified[1]**	**N/A**
5.1 Installation Checks			
5.1.1 Zone thermostat (or remote zone temperature sensor) in dwelling units, within the zone being served.	☐	☐	☐
5.2 Functional Testing			
5.2.1 Measured zone temperature is within 5°F of zone temperature displayed on thermostat or sensor.	☐	☐	☐
5.2.2 System turns on when there is a call for heat and heating is provided. System turns off when the heating setpoint has been met. [7]	☐	☐	☐
If N/A, select the reason: ☐ due to high ambient temperature OR ☐ equipment lock-out	-	-	-
5.2.3 System turns on when there is a call for cooling and cooling is provided. System turns off when the cooling setpoint has been met. [7]	☐	☐	☐
5.2.4 Where OA inlets are connected to the dwelling unit HVAC system, a motorized damper is installed that closes when there is no call for ventilation or when fan is off.	☐	☐	☐

Rev. 05 – Rater Field Checklist

ENERGY STAR Multifamily New Construction

National Rater Field Checklist [1], Version 1.1 / 1.2 / 1.3 (Rev. 05)

7. Dwelling-Unit & Common Space Mechanical Vent. Systems ("Vent Systems") [55] & Inlets in Return Duct [59] (National HVAC Design Report Item # indicated in parenthesis)					
7.1 Ventilation manufacturer & model number on installed equipment matches either of the following (check box): [40] ☐ National HVAC Design Report ☐ Written approval received from designer				☐	☐ -
7.2 Rater-measured ventilation rate is within either ± 15 CFM or ±15% of dwelling unit design values (2.7), and meets or exceeds rates required by ASHRAE 62.2-2010. [60]				☐	☐ -
7.3 Measured ventilation rate is within either ± 15 CFM or ±15% of common space design values (2.9), and meets or exceeds rates required by ASHRAE 62.1-2010 (2.8). [61,62]				☐	☐ ☐
7.4 A ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a toggle wall switch, but not for a switch that's on the ventilation equipment).				☐	☐ -
7.5 For any outdoor air inlet connected to a ducted return of the dwelling unit HVAC system (Complete if present; otherwise check "N/A"): [59]				☐	☐ ☐
7.5.1 Controls automatically restrict airflow using a motorized damper during vent. Off-cycle and occupant override. [63]				☐	☐ -
7.6 Where OA inlets are connected to the dwelling unit HVAC system, a motorized damper is installed that closes when there is no call for ventilation or when fan is off.				☐	☐ ☐
7.8 If dwelling-unit Vent System controller operates the dwelling unit HVAC fan, then HVAC fan operation is intermittent and either the fan type is ECM / ICM (4.12), or the controls will reduce the run-time by accounting for HVAC system heating or cooling hours. [66]				☐	☐ ☐
7.9 In-unit bathroom fans or in-line fans are ENERGY STAR certified if used as part of the dwelling-unit mechanical ventilation system. [67]				☐	☐ ☐
7.10 If central exhaust fans, ≤ 1 HP, are installed as part of the dwelling-unit mechanical ventilation system, then they are direct-drive, ECM, with variable speed controllers. If > 1 HP, their motors meet or exceed efficiency standards for NEMA Premium ™ motors. [68]				☐	☐ ☐
7.11 Air inlet locations (Complete if ventilation air inlet locations were installed (2.23, 2.24); otherwise check "N/A"): [69]				-	- ☐
7.11.1 Inlet(s) pull ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit.				☐	☐ -
7.11.2 Inlet(s) are ≥ 2 ft. above grade or roof deck; ≥ 10 ft. of stretched-string distance from known contamination sources not exiting the roof, and ≥ 3 ft. distance from dryer exhausts and sources exiting the roof. [70,71]				☐	☐ -
7.11.3 Inlet(s) are provided with rodent / insect screen with ≤ 0.5 in. mesh.				☐	☐ -
8. Local Mechanical Exhaust (National HVAC Design Report Item # indicated in parenthesis)					
Dwelling Unit Mechanical Exhaust – In each dwelling unit kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards: [58, 72]					
Location		**Continuous Rate**	**Intermittent Rate [73]**	**Must Correct**	**Rater Verified [4]** **N/A [5]**
8.1 Kitchen	Airflow	≥ 5 ACH, based on kitchen volume [74, 75] (Alternative in Fn. 74)	≥ 100 CFM and, if not integrated with range, also ≥ 5 ACH based on kitchen volume [74, 75, 76]	☐	☐ -
	Sound	Recommended: ≤ 1 sone	Recommended: ≤ 3 sones		
8.2 Bathroom	Airflow	≥ 20 CFM	≥ 50 CFM	☐	☐ -
	Sound	Required: ≤ 2 sones	Recommended: ≤ 3 sones		
Mechanical Exhaust for Common Spaces [2] and Shared Garages					
8.3 Measured exhaust rates are ≥ ASHRAE 62.1-2010 rates (2c). [61]				☐	☐ ☐
8.4 Where an exhaust system is installed in a shared garage, it is equipped with controls that sense CO and NO2.				☐	☐ ☐

Rater Training Video – **Indoor Unit Functional Testing**

ENERGY STAR New Homes & Apartments

- Work with ENERGY STAR
- Program Requirements
- Residential Resources
  - § 45L Tax Credit
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Technical Guidance

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- Fact Sheets
- Rater Training Videos
- Supplemental Guidance
- Technical Bulletins

Rater Training Videos

- Completing Section 5 of the ENERGY STR MFNC HVAC Functional Testing Checklist - This video provides a review of Section 5 of the ENERGY STAR Multifamily New Construction HVAC Functional Testing Checklist (Rev. 04), which covers the installation and functional testing of indoor or terminal units for heating and cooling equipment.

#6 of 8. National Program Requirements
Exhibit 1, and language preceding it, updated for clarity

Rev. 04 Exhibit 1 Layout

Hot Climates (2012 IECC Zones 1,2,3) [13]	Mixed and Cold Climates (2012 IECC Zones 4,5,6,7,8) [13]
Residential Cooling Equipment (Where Provided) in Dwelling Units or Common Spaces. If not listed here, see Rater Field Checklist Exhibit X. [14]	
• Cooling equipment meets the applicable efficiency levels below:	
• 15 SEER AC, • Heat pump (See Residential Heating Equipment)	• 13 SEER AC, • Heat pump (See Residential Heating Equipment)
Residential Heating Equipment (Where Provided) in Dwelling Units or Common Spaces. If not listed here, see Rater Field Checklist Exhibit X. [14]	
• Heating equipment meets the applicable efficiency levels below, dependent on fuel and system type:	

• 80 AFUE gas furnace,
• 80 AFUE oil furnace,
• 80 AFUE boiler,
• 8.2 HSPF / 15 SEER air-source heat pump with electric or dual-fuel backup.
	• 95 AFUE ENERGY STAR gas furnace (common spaces see Exhibit X),
	• 85 AFUE ENERGY STAR oil furnace,
	• 90 AFUE ENERGY STAR gas boiler,
	• 86 AFUE oil boiler,
	• Heat pump, with efficiency as follows:
	  • *CZ 4:* 8.5 HSPF / 15 SEER air-source w/ electric or dual-fuel backup,
	  • *CZ 5:* 9.25 HSPF / 15 SEER air-source w/ electric or dual-fuel backup,
	  • *CZ 6:* 9.5 HSPF / 15 SEER air-source w/ electric or dual-fuel backup,
	  • CZ 7-8: 9.2 HSPF / 16 SEER air-source w/ electric or dual-fuel backup.

Envelope, Windows, & Doors

- Dwelling unit insulation levels meet 2012 IECC levels (Commercial, wood-frame) and Grade I installation per ANSI / RESNET / ICC 301. For common spaces, refer to Item 3.2 of the National Rater Design Review Checklist for insulation levels.

Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
Slab Insulation R-Value:	0	0	0	10	10	15	15	20
Slab Insulation Depth (ft):	0	0	0	2	2	2	2	2
Basement Wall Continuous Insulation R-Value:	0	0	0	7.5	7.5	7.5	10	12.5
Wood Framed Floor U-Factor:	0.066	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Mass Floor U-Factor:	0.322	0.087	0.076	0.074	0.064	0.057	0.051	0.051
Wall Assembly U-Factor:	0.064	0.064	0.064	0.064	0.064	0.051	0.051	0.036
Ceiling Assembly U-Factor:	0.027	0.027	0.027	0.027	0.021	0.021	0.021	0.021

- Infiltration rate: 0.30 CFM50/ft² of enclosure.
- Dwelling unit windows and doors, unless Class AW, meet the following:

Window U-Factor:	0.40 in CZs 1,2	0.30 in CZ 3	0.30 in CZ 4	0.27 in CZs 5,6,7,8
Window SHGC:	0.25 in CZs 1,2	0.25 in CZ 3	0.40 in CZ 4	Any in CZs 5,6,7,8
Door U-Factor:	Opaque: 0.17	≤½ lite: 0.25	>½ lite: 0.30	
Door SHGC:	Opaque: Any	≤½ lite: 0.25	>½ lite: 0.25 in CZs 1,2,3; 0.40 in CZs 4,5,6,7,8	

Class AW fenestration and common spaces meet 2015 IgCC levels (Commercial fenestration U-Factor requirements) below. [15]

Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
Fixed Window U-Factor:	0.48	0.48	0.44	0.36	0.36	0.34	0.28	0.28
Operable Window U-Factor:	0.62	0.62	0.57	0.43	0.43	0.41	0.35	0.35
Glazed Entrance Door U-Factor:	1.05	0.79	0.73	0.73	0.73	0.73	0.73	0.73
SHGC	0.25	0.25	0.25	0.40	0.40	0.40	any	any

Rev. 05 Exhibit 1 Layout

Table 1: Envelope, Ventilation, Water Heating, Lighting, Appliances, and Residential Heating and Cooling Equipment

Climate Zone Type	Hot and Mixed Climates				Cold Climates				
2012 IECC Climate Zone [14]	**1**	**2**	**3**	**4**	**4C**	**5**	**6**	**7**	**8**
Dwelling Unit Thermal Enclosure									
Ceiling, Wall & Floor Insulation Grade	I								
Ceiling Insulation U-Factor	0.027	0.027	0.027	0.027	0.021	0.021	0.021	0.021	0.021
Wall Insulation U-Factor	0.064	0.064	0.064	0.064	0.064	0.064	0.051	0.051	0.036
Frame Floor Insulation U-Factor	0.066	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Mass Floor U-Factor	0.322	0.087	0.076	0.074	0.064	0.064	0.057	0.051	0.051
Slab Insulation & Depth	None	None	None	R-10 2ft	R-10 2ft	R-10 2ft	R-15 2ft	R-15 2ft	R-20 2ft
Basement Wall Continuous Insulation R-Value	0	0	0	7.5	7.5	7.5	7.5	10	12.5
Common Space Thermal Enclosure									
All Assemblies	Refer to Item 2.1 of the National Rater Design Review Checklist for insulation levels								
Dwelling Unit Windows and Doors (Except Class AW)									
Window U-Factor	0.4	0.4	0.3	0.3	0.3	0.27	0.27	0.27	0.27
Window SHGC [15]	0.25	0.25	0.25	0.4	0.4	Any	Any	Any	Any
Door (U- Factor / SHGC) [15]	Opaque: U- Factor: 0.17 / SHGC: Any; ≤½ lite: U- Factor: 0.25 / SHGC: 0.25; >½ lite: U- Factor: 0.30								
>½ lite Door (SHGC) [15]	0.25	0.25	0.25	0.40	0.40	Any	Any	Any	Any
Common Space & Class AW Windows and Doors									
Fixed Window U-Factor	0.48	0.48	0.44	0.36	0.36	0.36	0.34	0.28	0.28
Operable Window U-Factor	0.62	0.62	0.57	0.43	0.43	0.43	0.41	0.35	0.35
Glazed Entrance Door U-Factor	1.05	0.79	0.73	0.73	0.73	0.73	0.73	0.73	0.73
SHGC	0.25	0.25	0.25	0.4	0.4	Any	Any	Any	Any
Residential Heating and Cooling Systems (See Table 2 for other HVAC systems.)									
Ductless Air Conditioning (SEER2)	15	15	15	13	13	13	13	13	13
Ducted Split System Air Conditioning (SEER2)	14.2	14.2	14.2	12.3	12.3	12.3	12.3	12.3	12.3
Ducted Single Packaged System Air Conditioning (SEER2) [16]	14.2	14.2	14.2	12.3	12.3	12.3	12.3	12.3	12.3
Gas Furnace (AFUE)	80	80	80	95	95	95	95	95	95
Oil Furnace (AFUE)	80	80	80	85	85	85	85	85	85
Gas Boiler (AFUE)	80	80	80	90	90	90	90	90	90
Oil Boiler (AFUE)	80	80	80	86	86	86	86	86	86
Ductless Heat Pump (HSPF2 / SEER2)	7.3 / 15	7.3 / 15	7.3 / 15	7.6 / 15	8.3 / 15	8.3 / 15	8.5 / 15	8.2 / 15	8.2 / 15
Ducted Split System Heat Pump (HSPF2 / SEER2)	6.9 / 14.2	6.9 / 14.2	6.9 / 14.2	7.2 / 14.2	7.8 / 14.2	7.8 / 14.2	8.0 / 14.2	7.8 / 15.2	7.8 / 15.2
Ducted Single Packaged System Heat Pump (HSPF2 / SEER2) [16]	6.8 / 14.2	6.8 / 14.2	6.8 / 14.2	7.1 / 14.2	7.7 / 14.2	7.7 / 14.2	7.9 / 14.2	7.7 / 15.2	7.7 / 15.2
Thermostat Type	Programmable								
Duct and Air Handler Location	100% Conditioned Space								

#6 of 8. National Program Requirements
Exhibit 1, and language preceding it, updated for clarity

Rev. 05 Exhibit 1 Layout

Table 1: Envelope, Ventilation, Water Heating, Lighting, Appliances, and Residential Heating and Cooling Equipment

Climate Zone Type	Hot and Mixed Climates				Cold Climates				
2012 IECC Climate Zone [14]	1	2	3	4	4C	5	6	7	8
Dwelling Unit Thermal Enclosure									
Ceiling, Wall & Floor Insulation Grade	I								
Ceiling Insulation U-Factor	0.027	0.027	0.027	0.027	0.021	0.021	0.021	0.021	0.021
Wall Insulation U-Factor	0.064	0.064	0.064	0.064	0.064	0.064	0.051	0.051	0.036
Frame Floor Insulation U-Factor	0.066	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Mass Floor U-Factor	0.322	0.087	0.076	0.074	0.064	0.064	0.057	0.051	0.051
Slab Insulation & Depth	None	None	None	R-10 2ft	R-10 2ft	R-10 2ft	R-15 2ft	R-15 2ft	R-20 2ft
Basement Wall Continuous Insulation R-Value	0	0	0	7.5	7.5	7.5	7.5	10	12.5
Common Space Thermal Enclosure									
All Assemblies	Refer to Item 2.1 of the National Rater Design Review Checklist for insulation levels								
Dwelling Unit Windows and Doors (Except Class AW)									
Window U-Factor	0.4	0.4	0.3	0.3	0.3	0.27	0.27	0.27	0.27
Window SHGC [15]	0.25	0.25	0.25	0.4	0.4	Any	Any	Any	Any
Door (U- Factor / SHGC) [15]	Opaque: U- Factor: 0.17 / SHGC: Any; ≤½ lite: U- Factor: 0.25 / SHGC: 0.25; >½ lite: U- Factor: 0.30								
>½ lite Door (SHGC) [15]	0.25	0.25	0.25	0.40	0.40	Any	Any	Any	Any
Common Space & Class AW Windows and Doors									
Fixed Window U-Factor	0.48	0.48	0.44	0.36	0.36	0.36	0.34	0.28	0.28
Operable Window U-Factor	0.62	0.62	0.57	0.43	0.43	0.43	0.41	0.35	0.35
Glazed Entrance Door U-Factor	1.05	0.79	0.73	0.73	0.73	0.73	0.73	0.73	0.73
SHGC	0.25	0.25	0.25	0.4	0.4	Any	Any	Any	Any

Residential Heating and Cooling Systems (See Table 2 for other HVAC systems.)									
Ductless Air Conditioning (SEER2)	15	15	15	13	13	13	13	13	13
Ducted Split System Air Conditioning (SEER2)	14.2	14.2	14.2	12.3	12.3	12.3	12.3	12.3	12.3
Ducted Single Packaged System Air Conditioning (SEER2) [16]	14.2	14.2	14.2	12.3	12.3	12.3	12.3	12.3	12.3
Gas Furnace (AFUE)	80	80	80	95	95	95	95	95	95
Oil Furnace (AFUE)	80	80	80	85	85	85	85	85	85
Gas Boiler (AFUE)	80	80	80	90	90	90	90	90	90
Oil Boiler (AFUE)	80	80	80	86	86	86	86	86	86
Ductless Heat Pump (HSPF2 / SEER2)	7.3 / 15	7.3 / 15	7.3 / 15	7.6 / 15	8.3 / 15	8.3 / 15	8.5 / 15	8.2 / 15	8.2 / 15
Ducted Split System Heat Pump (HSPF2 / SEER2)	6.9 / 14.2	6.9 / 14.2	6.9 / 14.2	7.2 / 14.2	7.8 / 14.2	7.8 / 14.2	8.0 / 14.2	7.8 / 15.2	7.8 / 15.2
Ducted Single Packaged System Heat Pump (HSPF2 / SEER2) [16]	6.8 / 14.2	6.8 / 14.2	6.8 / 14.2	7.1 / 14.2	7.7 / 14.2	7.7 / 14.2	7.9 / 14.2	7.7 / 15.2	7.7 / 15.2
Thermostat Type	Programmable								
Duct and Air Handler Location	100% Conditioned Space								
Infiltration									
Infiltration Rate (CFM50 / sq. ft. of enclosure)	0.30								
Water Heating When Rated in UEF									
Gas: Efficiency (UEF)	Gallons ≤ 55: medium-draw, 0.64 UEF; high-draw, 0.68 UEF Gallons > 55: medium-draw, 0.78 UEF; high-draw, 0.80 UEF								
Oil: Efficiency (UEF)	30 gal: 0.63 UEF | 40 gal: 0.61 UEF | 50 gal: 0.58 UEF 60 gal: 0.56 UEF | 70 gal: 0.54 UEF | 80 gal: 0.52 UEF								
Electric Efficiency (UEF)	0.93								
Water Heating When Rated in Et, Standby Loss (%/hr), or COP									
Electric Efficiency (COP, SL)	1.0 COP or SL ≤ 0.3 + 27/V_m								
Non-Electric Efficiency (Et)	85%								
Lighting, Appliances & Fixtures									
Lighting	90% Fluorescent or LED Lighting								
Refrigerators, Dishwashers, Clothes Washers and Dryers [17]	ENERGY STAR								
Bathroom Faucets, Aerators and Showerheads	WaterSense								

#6 of 8. National Program Requirements
Exhibit 1, and language preceding it, updated for clarity

Rev. 04, Rater Field Checklist, Exhibit X

Exhibit X – Prescriptive Minimum Heating and Cooling Equipment Efficiencies based on Version the building is certified to. Version 1, Version 1.1, and Oregon and Washington Version 1.2: †

Equipment Type	Minimum Efficiency
Room AC (window, through-wall, ductless mini-splits)	ENERGY STAR certified
Air conditioners, air cooled (<13 Kbtu/h)	13 SEER
Air conditioners, air cooled (≥13 and <65 Kbtu/h)	See Reference Design
Air conditioners, air cooled (≥65 and <240 Kbtu/h)	11.5 EER/12.0 IEER
Air conditioners, air cooled (≥240 and < 760 Kbtu/h)	10.0 EER/10.5 IEER
Electric resistance space heating [47]	• Not permitted in any dwelling unit using the Prescriptive Path • Electric resistance heating specified in common spaces and garages have a total heating capacity ≤ 12 kBtu/h (3.5 kW) per enclosed space and has automatic thermostatic controls
Warm-Air Furnace (<225 KBtu/h, common spaces)	78% AFUE or 80% Et
Warm-Air Furnace (<225 KBtu/h, dwelling units)	See Reference Design. For PTAC, use 80% Et
Warm-Air Furnace (≥225 KBtu/h)	80% Et (gas) or 81% Et (oil)
Packaged Terminal Air Conditioner (PTAC < 7 kBtu/h)	11.9 EER
Packaged Terminal Air Conditioner (PTAC > 15 kBtu/h)	9.5 EER
Packaged Terminal Air Conditioner (≥7 and ≤15 KBtu/h)	14.0 – (0.300 X Cap/1000) EER
Packaged Terminal Heat Pump (PTHP)	Cooling: 14.0– (0.3 X Cap/1000) EER Heating: 3.7– (0.052 X Cap/1000) COP
Air cooled heat pump (≥13 and <65 KBtu/h)	See Reference Design
Air cooled heat pump (≥65 and <240 KBtu/h)	Cooling: 11.1 EER/11.6 IEER Heating: 3.3 COP (@47°F DB)
Air cooled heat pump (≥240 KBtu/h)	Cooling: 9.6 EER/9.6 IEER Heating: 3.2 COP (@47°F DB)
Water-source heat pump (<135 KBtu/h)	Cooling: 14.0 EER(86°F entering water) Heating: 4.2 COP(68°F entering water)
Boilers, hot water (<300,000 Btu/h)	See Reference Design
Boilers, hot water (≥300,000 Btu/h)	86% E_t (89% E_t if using heat pumps)
VRF Air Conditioners and Heat Pumps	See Tables 6.8.1I and 6.8.1J of ASHRAE 90.1-2010
Air-cooled chillers with or without condenser	10.0 EER / 12.5 IPLV
Water-cooled chiller, positive displacement (<75 tons)	0.780 kW/ton (Full load) / 0.630 kW/ton (IPLV)
Water-cooled chiller, positive displacement (75-150 tons)	0.775 kW/ton (Full load) / 0.615 kW/ton (IPLV)
Water-cooled chiller, positive displacement (150-300tons)	0.680 kW/ton (Full load) / 0.580 kW/ton (IPLV)
Water-cooled chiller, positive displacement (>300 tons)	0.620 kW/ton (Full load) / 0.540 kW/ton (IPLV)
Water-cooled, centrifugal (<300 tons)	0.634 kW/ton (Full load) / 0.596 kW/ton (IPLV)
Water-cooled, centrifugal (≥300 and <600 tons)	0.576 kW/ton (Full load) / 0.549 kW/ton (IPLV)
Water-cooled, centrifugal (≥600 tons)	0.570 kW/ton (Full load) / 0.539 kW/ton (IPLV)

Rev. 05, NPR v1.1, Exhibit 1, Table 2

Table 2: Commercial Minimum Heating and Cooling Equipment
For Equipment Types not listed here, minimum efficiencies shall be based on those listed in ASHRAE 90.1-2010.

Equipment Type	Minimum Efficiency
Room AC (window, through-wall, ductless mini-splits)	ENERGY STAR certified
Air conditioners, air cooled (<13 Kbtu/h)	12.3 SEER2
Air conditioners, air cooled (≥13 and <65 Kbtu/h)	Dwelling unit systems & common space split systems: See Table 1; Common space single package: meet ASHRAE 90.1-2010
Air conditioners, air cooled (≥65 and <240 Kbtu/h)	11.5 EER/12.0 IEER
Air conditioners, air cooled (≥240 and < 760 Kbtu/h)	10.0 EER/10.5 IEER
Electric resistance space heating [18]	• Not permitted in any dwelling unit using the Prescriptive Path • Electric resistance heating specified in common spaces and garages has a total heating capacity ≤ 12 kBtu/h (3.5 kW) per enclosed space and has automatic thermostatic controls
Warm-Air Furnace (<225 KBtu/h, common spaces)	78% AFUE or 80% Et
Warm-Air Furnace (<225 KBtu/h, dwelling units)	See Reference Design. For PTAC, use 80% Et
Warm-Air Furnace (≥225 KBtu/h)	80% Et (gas) or 81% Et (oil)
Packaged Terminal Air Conditioner (PTAC < 7 kBtu/h)	11.9 EER
Packaged Terminal Air Conditioner (PTAC > 15 kBtu/h)	9.5 EER
Packaged Terminal Air Conditioner (≥7 and ≤15 KBtu/h)	14.0 – (0.300 X Cap/1000) EER
Packaged Terminal Heat Pump (PTHP)	Cooling: 14.0– (0.3 X Cap/1000) EER Heating: 3.7– (0.052 X Cap/1000) COP
Air cooled heat pump (≥13 and <65 KBtu/h)	Dwelling unit systems & common space split systems: See Table 1; Common space single package: meet ASHRAE 90.1-2010
Air cooled heat pump (≥65 and <240 KBtu/h)	Cooling: 11.1 EER/11.6 IEER Heating: 3.3 COP (@47°F DB)
Air cooled heat pump (≥240 KBtu/h)	Cooling: 9.6 EER/9.6 IEER Heating: 3.2 COP (@47°F DB)
Water-source heat pump (<135 KBtu/h)	Cooling: 14.0 EER(86°F entering water) Heating: 4.2 COP(68°F entering water)
Boilers, hot water (<300,000 Btu/h)	See Reference Design
Boilers, hot water (≥300,000 Btu/h)	86% E_t (89% E_t if using heat pumps)
VRF Air Conditioners and Heat Pumps	See Tables 6.8.1I and 6.8.1J of ASHRAE 90.1-2010
Air-cooled chillers with or without condenser	10.0 EER / 12.5 IPLV
Water-cooled chiller, positive displacement (<75 tons)	0.780 kW/ton (Full load) / 0.630 kW/ton (IPLV)
Water-cooled chiller, positive displacement (75-150 tons)	0.775 kW/ton (Full load) / 0.615 kW/ton (IPLV)
Water-cooled chiller, positive displacement (150-300tons)	0.680 kW/ton (Full load) / 0.580 kW/ton (IPLV)
Water-cooled chiller, positive displacement (>300 tons)	0.620 kW/ton (Full load) / 0.540 kW/ton (IPLV)
Water-cooled, centrifugal (<300 tons)	0.634 kW/ton (Full load) / 0.596 kW/ton (IPLV)
Water-cooled, centrifugal (≥300 and <600 tons)	0.576 kW/ton (Full load) / 0.549 kW/ton (IPLV)
Water-cooled, centrifugal (≥600 tons)	0.570 kW/ton (Full load) / 0.539 kW/ton (IPLV)

#7 of 8. National Program Requirements
Exhibit 2 and 4, combined and revised

Rev. 04 Exhibit 2 and 4

Exhibit 2: Mandatory Requirements for All Certified Multifamily Buildings

Party Responsible	Mandatory Requirements
Requirements Applicable to Track A & B	
Rater	• Completion of MFNC National Rater Design Review Checklist, Version 1 / 1.1 / 1.2 • Completion of MFNC National Rater Field Checklist, Version 1 / 1.1 / 1.2
Builder or Developer	• Completion of MFNC National Water Management System Requirements, Version 1 / 1.1 / 1.2
Requirements Only Applicable to Track A – HVAC Grading by Rater [16]	
HVAC System Designer	• Completion of HVAC design report(s) compliant with ANSI / ACCA / RESNET 310, plus the SFNH / MFNC National HVAC Design Supplement(s) to Std. 310 for Dwellings & Units, All Versions • Completion of the MFNC National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems, All Versions, where applicable
Functional Testing Agent	• Completion of applicable sections of the National HVAC Functional Testing Checklist, Version 1 / 1.1 / 1.2. Exempt from Sections 2 and 3 for Dwelling Unit HVAC as the Rater is the party responsible for assessing these systems installation quality in accordance with ANSI / RESNET / ACCA 310
Requirements Only Applicable to Track B – HVAC Testing by FT Agent	
HVAC System Designer	• Completion of MFNC National HVAC Design Report, Version 1 / 1.1 / 1.2
Functional Testing Agent	• Completion of MFNC National HVAC Functional Testing Checklist, Version 1 / 1.1 / 1.2

Exhibit 4: ASHRAE and Prescriptive Path MRO Documents

The following documents must be submitted to the MRO. Those designated as 'final only' are only submitted at final certification.

Party Responsible	Documents
Requirements Applicable to All Buildings	
Rater	• Multifamily Workbook • MFNC National Rater Design Review Checklist, Version 1 / 1.1 / 1.2 • MFNC National Rater Field Checklist, Version 1 / 1.1 / 1.2 (Final only) • Construction Documents • Photo Documentation (Final only)
Requirements Applicable to ASHRAE Path	
ASHRAE Modeler	• ASHRAE Path Calculator OR ASHRAE Standard 90.1 Performance Based Compliance Form • Modeling file OR model input and output files
Requirements Only Applicable to Track A – HVAC Grading by Rater [16]	
HVAC System Designer	• HVAC design report(s) compliant with ANSI / ACCA / RESNET 310 • SFNH / MFNC National HVAC Design Supplement(s) to Std. 310 for Dwellings & Units, All Versions • MFNC National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems, All Versions, where applicable
Functional Testing Agent	• National HVAC Functional Testing Checklists, Version 1 / 1.1 / 1.2
Requirements Only Applicable to Track B – HVAC Testing by FT Agent	
HVAC System Designer	• MFNC National HVAC Design Report, Version 1 / 1.1 / 1.2
Functional Testing Agent	• MFNC National HVAC Functional Testing Checklist, Version 1 / 1.1 / 1.2 (Final only)

Rev. 05 Exhibit 2

Exhibit 2: Mandatory Requirements for All Certified Multifamily Buildings

Party Responsible	Mandatory Requirements
Requirements Applicable to All Buildings	
Rater	• Completion of MFNC National Rater Design Review Checklist, Version 1.1 / 1.2 / 1.3 • Completion of MFNC National Rater Field Checklist, Version 1.1 / 1.2 / 1.3 • Completion of Multifamily Workbook • Capture of Specified Photo Documentation
Functional Testing Agent	• Completion of MFNC National HVAC Functional Testing Checklist, Version 1.1 / 1.2 / 1.3 Note: Sections 2 and 3 are exempt for buildings following Track A for Dwelling Unit HVAC systems as the Rater is the party responsible for assessing the installation quality of these systems in accordance with ANSI / RESNET / ACCA 310.
Requirements Only Applicable to Track A – HVAC Grading by Rater [19]	
HVAC System Designer	• Completion of HVAC design report(s) compliant with ANSI / ACCA / RESNET 310, plus the SFNH / MFNC National HVAC Design Supplement(s) to Std. 310 for Dwellings & Units, All Versions • Completion of the MFNC National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems, All Versions, where applicable
Requirements Only Applicable to Track B – HVAC Testing by FT Agent	
HVAC System Designer	• Completion of MFNC National HVAC Design Report, Version 1.1 / 1.2 / 1.3
Requirements Only Applicable to ASHRAE Path	
ASHRAE Modeler	• Completion of ASHRAE Standard 90.1 Performance Based Compliance Form (Compliance Form) and ENERGY STAR MFNC / ZERH Companion Tool (Companion Tool)

#8 of 8. California Program Requirements v1.3
Performance target based on building model

- All buildings must pursue the whole building modeling path.
  - The performance target is 10% savings over Title 24-2019.
  - The dwelling unit modeling path, EDR performance target, and the Reference Design for Common Spaces have been removed.
  - Common spaces can be modeled separately, but the common space model must also meet the performance target.
- Oversight is based on building type per Title 24-2019.
  - Low-rise multifamily buildings are certified through an HCO.
  - High-rise multifamily buildings are certified through an MRO.

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Other clarifications and refinements

#1 of 16. National Rater Field Checklist
Streamlined air sealing details

- Refined mandatory air sealing details:
  - Eliminated requirement to insulate exterior surface of recessed lighting fixtures in cathedral ceilings in cold climates.
  - Eliminated requirement for continuous top plate or blocking at top of walls.
    - This requirement is now addressed in ANSI / RESNET / ICC 301, which requires a six-sided air barrier for fibrous batt and fibrous loose fill insulation to achieve Grade I or II.
  - Removed two air-sealing exemptions related to stucco cladding: one for air sealing the sill plate to foundation or sub-floor and one for air sealing rough openings around windows and doors.

#2 of 16. Rater Design Review Checklist: **Commercial spaces and thermal backstop**

- Thermal envelope backstop requirements do not apply to the interior assemblies adjacent to commercial spaces, as they are expected to be conditioned spaces.

2. High-Performance Insulation & Fenestration			
2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [8, 9, 10, 11, 12, 13]	☐	☐	-
2.2 In CZ 1-3, 4A, and 4B, specified windows, skylights, and doors that are ≥ 50% glazed achieve the area-weighted average SHGC described in Footnote 11 and 13 and are documented through ERI energy modeling or in the Multifamily Workbook. [7, 13]	☐	☐	☐

8. The building thermal envelope must include assemblies that are adjacent to other buildings, the exterior, or a garage; however, it does not include assemblies that separate Dwelling Units and Common Spaces from commercial or retail spaces within the building.

#3 of 16. Rater Design Review Checklist: **Window rating options**

- The documentation options for verifying that U-factor and SHGCs meet program requirements have been expanded to also allow values determined by an accredited laboratory in accordance with NFRC 100.

2. High-Performance Insulation & Fenestration			
2.1 Specified total building thermal envelope meets the requirements described in Footnote 11 and 12, and is documented through ERI energy modeling or in the Multifamily Workbook. [7, 8, 9, 10, 11, 12, 13]	☐	☐	-
2.2 In CZ 1-3, 4A, and 4B, specified windows, skylights, and doors that are ≥ 50% glazed achieve the area-weighted average SHGC described in Footnote 11 and 13 and are documented through ERI energy modeling or in the Multifamily Workbook. [7, 13]	☐	☐	☐

13. The area-weighted average SHGC of all windows, skylights, and doors that are ≥ 50% glazed must not exceed the area-weighted average of the SHGC requirements specified in the Fenestration section of the appliable Table in Footnote 11. If no NFRC rating is noted on the window or in product literature (e.g., for site-built fenestration), select the U-factor and SHGC value from Tables 4 and 10, respectively, in 2013 ASHRAE Handbook of Fundamentals, Chapter 15. Select the highest U-factor and SHGC value among the values listed for the known window characteristics (e.g., frame type, number of panes, glass color, and presence of low-e coating). Alternatively, where the U-factor is determined in accordance with NFRC 100 by a laboratory accredited by a nationally recognized accreditation organization, such as the NFRC, documentation provided by the laboratory or manufacturer listing the assembly U-factor and SHGC can be used in lieu of NFRC labels. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion. The following exceptions apply:

    i. 5% of all combined fenestration area (glazed and opaque) shall be exempt from the U-factor and SHGC requirements, and shall be excluded from the area-weighted averages calculated in Item 2.1 and 2.2.

    ii. In Phius or PHI certified buildings, where triple-glazed window assemblies with thermal breaks / spacers between the panes are used, such windows meet the intent of Items 2.1 and 2.2 and shall be excluded from the area-weighted averages calculated.

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#4 of 16. Rater Design Review Checklist: **Track A requirements for common spaces using Std. 310 testing**

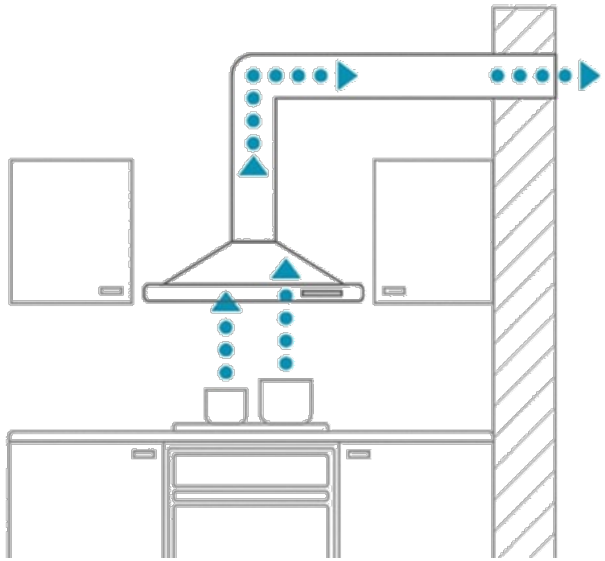
- Where using Track A, and common space systems are going to be tested using ANSI / RESNET / ACCA 310, those common spaces no longer need to meet the design review criteria.
- Also, common space systems serving multiple common spaces may use the option to follow the ANSI / RESNET / ACCA 310 testing, as long as they still meet the capacity limits.

34a. Review of ANSI / RESNET / ACCA 310 HVAC Design Report with ENERGY STAR Supplements [14]			
34a.1 The following documentation collected for records, with no applicable Items left blank. [15]			
34a.1.1 For all dwelling units, HVAC design report(s) compliant with ANSI / RESNET / ACCA 310 and the National HVAC Design Supplement(s) to Std. 310 for Dwellings & Units.	☐	☐	-
~~4a.1.2 For common spaces using ANSI / RESNET / ACCA 310, HVAC design report(s) compliant with ANSI / RESNET / ACCA 310.~~	~~☐~~	~~☐~~	~~☐~~
34a.1.~~3~~2 National HVAC Design Supplement to Std. 310 for Common Spaces & Central Systems.	☐	☐	☐
34a.2 ~~For systems meeting Item 4a.1.1 or 4a.1.2~~For all dwelling units, ANSI / RESNET / ACCA 310 design review criteria have been met for applicable housing type.	☐	☐	-

#5 of 16. Rater Design Review Checklist: **Optional kitchen ventilation confirmation**

- Optional Section 4 has been revised to include an Item to confirm that kitchen exhausts directly to the outdoors.

~~45~~. Additional Construction Document Review – Recommended, not required	
~~45~~.6 Verify that HVAC details are in compliance with checklist items in Sections 5 - 10 of the National Rater Field Checklist.	☐
~~54~~.6.1 Verify that HVAC design includes access and means to measure the dwelling-unit mechanical ventilation airflow rate.	☐
~~45~~.6.2 Verify that bedrooms with design airflow ≥ 150 CFM are specified with a combination of transfer grilles, jump ducts dedicated return ducts, and/or undercut doors to achieve a Rater-measured pressure differential ≥ -5 Pa and ≤ +5 Pa with respect to the main body of the dwelling unit when all air handlers are operating.	☐
~~45~~.6.3 Verify that Functional Testing Agent(s) hold(s) credential required to complete the applicable sections of the National HVAC Functional Testing Checklist for all HVAC equipment in the building. For Track A, a Functional Testing Agent is not needed to complete Sections 2 and 3 for HVAC systems that will be verified and graded by the Rater. [30]	☐
~~45~~.6.4 Verify that dwelling unit local kitchen exhausts directly to the outdoors	☐



#6 of 16. National Rater Field Checklist
Motorized dampers for stairwell and elevator shaft vents

- Buildings in Climate Zones 1, 2, and 3 are exempt from the requirement to have a motorized damper where stairwell or elevator shaft vents are present.

5. ~~10~~ 11 Where present in CZ ~~4~~ 8, stair and elevator shaft vents are equipped with motorized dampers that are capable of being automatically closed during normal building operation and are interlocked to open as required by fire and smoke detection systems. Dampers are verified to be closed at the time of inspection.	☐	☐	☐	☐

#7 of 16. National Rater Field Checklist
Space heating temperature limits for heated garages & plenums

- To reinforce the requirement for a 40ºF temperature limit in garages and heated plenums, Item 5.12 was revised.

5.~~11~~ 12 Garage heating,~~/~~ plenum heating~~ers~~, and ~~F~~freeze protection systems~~, such as heat tracing of piping and heat exchangers, including self regulating heat tracing, and garage / plenum heaters~~ include automatic controls that are verified to shut ~~off the~~ systems off above 40°F space or ~~when~~ pipe wall ~~or garage / plenum~~ temperatures~~, as applicable are above 40°F~~. Freeze protection systems include heat tracing of piping, even if self-regulating.

5.12 Garage heating, plenum heating, and freeze protection systems include automatic controls that are verified to shut systems off above 40°F space or pipe wall temperatures, as applicable. Freeze protection systems include heat tracing of piping, even if self-regulating.

#7 of 16. National Rater Field Checklist
Space heating temperature limits for heated garages & plenums

- A footnote was also added to Items 1.8 and 1.9 as a reminder of these temperature limits.

1.7 Heated plenums in unconditioned space or ambient conditions must meet the following requirements.[17]
1.7.1 Sides of heated plenum are an air barrier and insulated to ≥ R-3ci in CZ 1-4; ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8,[9] **AND;**
1.7.2 Insulation at top of heated plenum meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC,[9, 18] **AND;**
1.7.3 Bottom of heated plenum must have at least R-13 insulation.[18, 19]
1.8 Garages with space heating must meet the following requirements.[17]
1.8.1 Insulation on above grade walls and walls on the first story below grade ≥ R-5ci in CZ 5-6; ≥ R-7.5ci in CZ 7; ≥ R-9.5ci in CZ 8,[9] **AND;**
1.8.2 Ceiling insulation meets Item 1.6 where applicable. Otherwise, meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC.[9]

~~17.~~ 17. Compliance with Items 1.~~5~~ 7 and 1.~~6~~ 8 is not required for buildings pursuing the ASHRAE Path, but the energy used by the heating systems must be modeled following the requirements in the Simulation Guidelines, available at www.energystar.gov/mfguidance. Heated plenums and garages with space heating must also comply with Item 5.12~~11~~.

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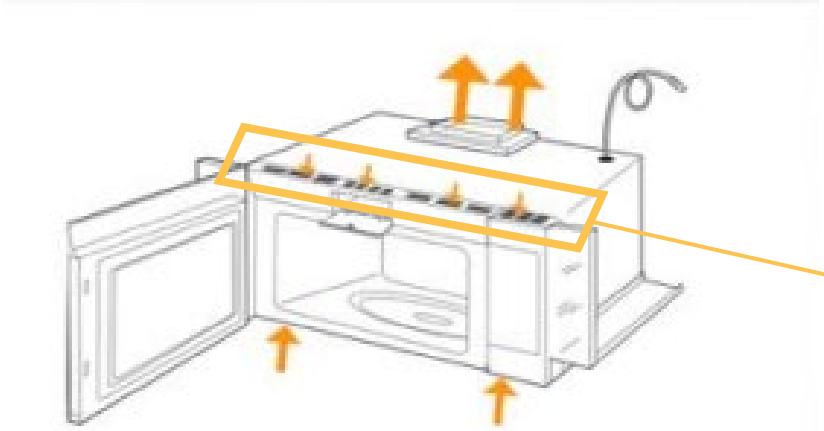
#8 of 16. National Rater Field Checklist
Sealing top vents of microwave exhaust fan when measuring airflow

- To encourage and facilitate the measurement of microwave-integrated exhaust fan airflow, Raters are permitted to tape off all air inlets except at the bottom.
- No correction factors shall be applied to the measured airflow to account for the increased airflow restriction caused by the tape.

~~77.~~60. The dwelling-unit ventilation air flows and local exhaust air flows shall be determined and documented by a Rater using ANSI / RESNET / ICC 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO or MRO that the building is being certified under. To facilitate testing the air flow of a microwave-integrated exhaust fan, Raters are permitted to tape off all air inlets except at the bottom. However, no correction factors shall be applied to the measured air flow to account for the increased airflow restriction. In Item 7.2, the dwelling-unit ventilation rates required by ASHRAE 62.2-2010 can be calculated using the



Top inlets can be sealed during testing.

#9 of 16. National Rater Field Checklist
90% LEDs required for all common spaces, garages and exterior

- All common spaces, garages and exterior lighting must have 90% LEDs.
- The Lighting Power Density (LPD) alternative and the requirement to meet the ENERGY STAR Reference Design efficiency have been removed.

12.3 Common Spaces [2] , Exterior, and Garages: 90% of installed lighting fixtures are integrated LED fixtures or contain LED lamps. [84] ~~See Footnote 85 for alternate options.~~
~~12.4 ERI Path: All exterior and common space lighting fixtures meet the efficiency requirements in the ENERGY STAR Multifamily Reference Design, except fixtures located on dwelling unit balconies.~~ [88, 89]
12.~~5~~ 4 Prescriptive Path: All dwelling unit lighting fixtures ~~(i.e., dwelling units, common spaces, and exterior)~~ meet the efficiency requirements in the ENERGY STAR Multifamily Reference Design.

#10 of 16. National Rater Field Checklist
Lighting controls clarifications

- The allowable types of lighting controls have been clarified to include occupancy sensors, vacancy sensors, and programmed timers in all Paths
- And a definition for "bi-level" has been added.

12. Lighting				
12.1 Common Space [2] Lighting Controls:				
12.1.1 ERI and Prescriptive Path: All common spaces [2] (including shared garages), except the building lobby, mechanical equipment rooms, and where automatic shutoff would endanger the safety of occupants [82], have occupancy or vacancy sensors, programmed timers, or automatic bi-level lighting controls [83] installed and operation has been verified.	☐	☐	☐	☐
12.1.2 ASHRAE Path only: All common spaces [2] (including shared garages), except the building lobby, mechanical equipment rooms, corridors, and stairwells and where automatic shutoff would endanger the safety of occupants [82], have occupancy or vacancy sensors, programmed timers, or automatic bi-level lighting controls [83] installed and operation has been verified.	☐	☐	☐	☐

83. Bi-level lighting controls include any design strategy that achieves at least one intermediate step between all fixtures being fully ON and fully OFF that provides 30-70% of full lighting power to that space. This can be achieved by light fixtures with integral bi-level controls or with occupancy sensors that activate select fixtures ON/OFF, while the others remain fully on.

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#11 of 16. National HVAC Design Report
Common space ventilation limits

- For buildings using the ERI or Prescriptive Path, the calculation for assessing whether common space ventilation exceeds 150% of ASHRAE 62.1 requirements has been modified to **allow the sum of all outdoor air** provided to these common spaces to be compared to the **sum of the required outdoor air** ventilation.

2a. Dwelling Unit & Common Space Mechanical Ventilation Design ("Vent System") [3] & Inlets in Return Duct [4, 5, 6]	Designer Verified
Airflow:	
2.1 Dwelling unit ventilation airflow design rate & run-time meet the requirements of Section 4 of ASHRAE 62.2 [7] – _____ Prescriptive Path Only: Rates shall not exceed 2013 rates by more than 50%. [8]	☐
2.2 Common space outdoor airflow design rate meet the requirements of Section 6 of ASHRAE 62.1 [9, 10] – _____ ERI and Prescriptive Path Only: Rates shall not exceed 2013 rates by more than 50%. (11)	☐

11. When calculating whether common space ventilation rates exceed ASHRAE 62.1-2013 rates by more than 50%, the calculation should use the minimum rates listed in Section 6 of the Standard by space, but it is permitted to combine the total ventilation provided to all common space areas when determining whether ventilation exceeds the 50%.

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#12 of 16. National HVAC Design Report
Common spaces required to meet ASHRAE 62.1 exhaust rates

- Only the common spaces listed in the HVAC Design Report are required to be designed to meet ASHRAE 62.1 exhaust requirements and have their airflows verified by the Rater.

2c. Common Space and Garage Minimum Exhaust Rates – System(s) are designed that mechanically exhaust air from each common space listed below, as required by ASHRAE 62.1-2010 (or later).					☐
Location	**ASHRAE 62.1 Rate**	**Design Rate**	**Location**	**ASHRAE 62.1 Rate**	**Design Rate**
Janitor Room	1 cfm/sq. ft.		Common space kitchen [28]	50 cfm / 100 cfm	
Trash / Recycling Room	1 cfm/sq. ft.		Common space bathroom [29]	50 cfm per toilet / urinal	
Parking Garage	0.05 cfm/sq. ft., standby 0.75 cfm/sq. ft., full-on		☐ Shared garage exhaust fan controls include CO and NO2 sensors.		
3. Heating & Cooling Loads					

#13 of 16. National HVAC Functional Testing Checklist
Design airflow data for common spaces

- Only the design HVAC fan airflows for dwelling unit systems should be taken from Section 5.2 of the HVAC Design Report;
- For common space systems, the airflows can be obtained from other documents.

3. Indoor HVAC Fan Airflow - This section must be completed for split air conditioners, unitary air conditioners, air-source heat pumps (including multi-splits), and water-source (i.e., geothermal or water-loop) heat pumps up to 65 kBtuh with forced-air distribution systems (i.e., ducts) and to furnaces up to 225 kBtuh with forced-air distribution systems (i.e., ducts), whether serving dwelling units or other common spaces in the building. Mini-splits, ducted or non-ducted, are exempt; however, multi-split systems such as shared VRF systems, where indoor HVAC fans with forced-air distribution are connected to a shared outdoor unit that exceeds 65 kBtuh, are not exempt. [5]
3.8 Measured HVAC fan airflow (Item 3.7) is ± 15% of design HVAC fan airflow (For dwelling unit systems, use design airflow as reported in Item 5.2 on National HVAC Design Report).

#14 of 16. All program documents: **Requirements for commercial and retail spaces**

- For most buildings, there are no requirements for the commercial and retail spaces.
- The Simulation Guidelines allow ASHRAE Path models to claim credit for efficiency measures in commercial spaces where they meet program requirements, but these commercial spaces must then be verified by the Rater to meet program requirements, just like common spaces. In Rev. 05, this requirement was added to all other program documents.

Rev. 05 National Program Requirements

4. The term 'common space' refers to any spaces in the building being certified that serve a function in support of the residential part of the building that is not part of a dwelling or sleeping unit. This includes spaces used by residents, such as corridors, stairs, lobbies, laundry rooms, exercise rooms, residential recreation rooms, and dining halls, as well as offices and other spaces used by building management, administration or maintenance in support of the residents. For the ASHRAE Path, the requirements for 'common spaces' apply to commercial or retail spaces where they are included in the energy model and savings contribute to achieving the Performance Target.

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#15 of 16. Simulation Guidelines: **Minor Clarifications**

- The 40% maximum window to wall ratio for the Baseline Building is required for both new construction and existing buildings.
- A lighting power density of 0.6 W/ft2 must be modeled in the Design and As-Built buildings for rooms or portions of rooms in dwelling units without specified hardwired lighting.
- Appliances may always be classified as “unregulated loads”, even where taking credit for their improved performance over the Baseline.

#16 of 16. Applicable Program Reqs., Versions, & Revs. by Location
Applicable permit date is tied to permit that governs efficiency features

- In cases where multiple permits are issued, the 'permit date' is the one on which the permit authorizing construction of the building, including the building features affecting energy use, was issued.

ENERGY STAR Multifamily New Construction
Applicable Program Requirements, Versions, and Revisions
by Location (Rev. 05)

This document, available at http://www.energystar.gov/mfnc, is designed to be used in conjunction with the Multifamily New Construction (MFNC) national and regional program requirements documents. Use Exhibit 1 or, for California, Exhibit 2 to determine the applicable MFNC program requirements, including the minimum Version and Revision, to which a building is eligible to be certified. For information about the minimum program versions eligible to satisfy the Section 45L New Energy Efficient Home Credit, visit www.energystar.gov/taxcredits.

A building may only be certified to the MFNC program requirements applicable to the location of the building, as listed in the Exhibits below. For locations where both national and regional program requirements have been listed, a building may be certified to either one.

Where the EPA has defined a newer Version and / or Revision of the same ENERGY STAR program requirements, buildings are eligible to be certified to the new Version / Revision. For example, if a building is eligible to be certified to Version 1.1 of the MFNC National Program Requirements, then it is also eligible to be certified to Version 1.2 of the MFNC National Program Requirements.

Exhibit 1 and 2 contain all Versions and Revisions eligible for use for buildings permitted on or after January 1, 2023. Program requirements applicable prior to this date can be found in the Archives.

Exhibit 1: Applicable ENERGY STAR MFNC Program Requirements, Versions, and Revisions for All Locations Except California

Building Is Built in This State Or Territory:	Building Is Permitted [1, 2] On or After This Date:	For Buildings Meeting the Adjacent Criteria, These Are the Applicable Program Requirements, Including Minimum Version ("v") & Revision ("Rev.")	
AL, AK, AZ, AR, CO, IN, ID, KS, KY, LA, MS, MO, NH, NC, ND, OK, SC, SD, TN	07-01-2021	MFNC National v1	Rev. 02
	01-01-2024	MFNC National v1.1	Rev. 03

1. The 'permit date' is the date on which the permit authorizing construction of the building was issued. In cases where multiple permits are issued for a project (e.g., footing permits, building permits), the 'permit date' is the date on which the permit authorizing construction of the building, including the building features affecting energy use (e.g., insulation levels, window U/SHGC specifications, mechanical equipment efficiency), was issued.

   Alternatively, the date of the Rater's first site visit or the application date of the permit authorizing construction of the building including features affecting energy use (e.g., insulation levels, window U/SHGC specifications, mechanical equipment efficiency) is allowed to be used as the 'permit date'.

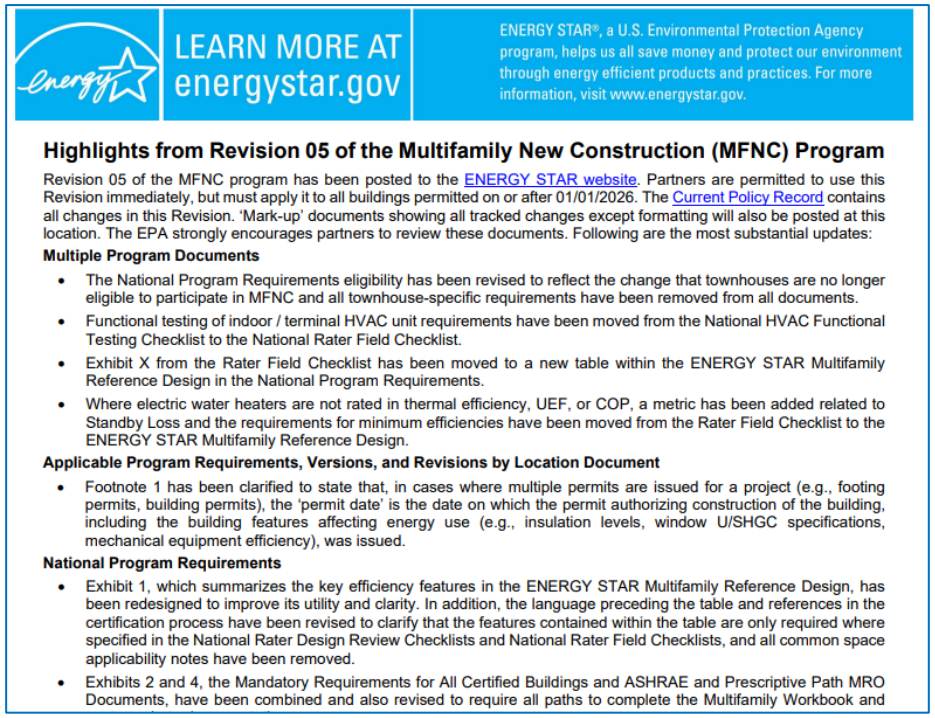
Summary of most notable changes in Rev. 05

- Top ten changes:
  1. Limit townhouse eligibility to SFNH
  2. Require Multifamily Workbook for all paths
  3. Eliminated **some** mandatory reduced thermal bridging requirements
  4. Reduced minimum mass floor insulation required over garage
  5. Narrowed the scope of builder-verified items
  6. Require Raters to capture photos, including selfie, for all paths
  7. Sunset the Water Management System Requirements
  8. Consolidated ASHRAE target and documentation
  9. Added new central exhaust duct leakage test option
  10. Updated VRF Functional testing protocols

- Additional clarifications and refinements, including relocating requirements.

Implementation of Revision 05

- Released 01/15/25.
- Updated program documents at: www.energystar.gov/newhomesrequirements.
- One-page highlights document, tracked-changes documents, and updated Policy Record will be available at: www.energystar.gov/newhomespolicyrecord
- Implementation date of 01/01/2026.
  - You can use Rev. 05 for any building.
  - You must use Rev. 05 for any building permitted after 01/01/26.



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Highlights from Revision 05 of the Multifamily New Construction (MFNC) Program

Revision 05 of the MFNC program has been posted to the ENERGY STAR website. Partners are permitted to use this Revision immediately, but must apply it to all buildings permitted on or after 01/01/2026. The Current Policy Record contains all changes in this Revision. 'Mark-up' documents showing all tracked changes except formatting will also be posted at this location. The EPA strongly encourages partners to review these documents. Following are the most substantial updates:

Multiple Program Documents

- The National Program Requirements eligibility has been revised to reflect the change that townhouses are no longer eligible to participate in MFNC and all townhouse-specific requirements have been removed from all documents.
- Functional testing of indoor / terminal HVAC unit requirements have been moved from the National HVAC Functional Testing Checklist to the National Rater Field Checklist.
- Exhibit X from the Rater Field Checklist has been moved to a new table within the ENERGY STAR Multifamily Reference Design in the National Program Requirements.
- Where electric water heaters are not rated in thermal efficiency, UEF, or COP, a metric has been added related to Standby Loss and the requirements for minimum efficiencies have been moved from the Rater Field Checklist to the ENERGY STAR Multifamily Reference Design.

Applicable Program Requirements, Versions, and Revisions by Location Document

- Footnote 1 has been clarified to state that, in cases where multiple permits are issued for a project (e.g., footing permits, building permits), the 'permit date' is the date on which the permit authorizing construction of the building, including the building features affecting energy use (e.g., insulation levels, window U/SHGC specifications, mechanical equipment efficiency), was issued.

National Program Requirements

- Exhibit 1, which summarizes the key efficiency features in the ENERGY STAR Multifamily Reference Design, has been redesigned to improve its utility and clarity. In addition, the language preceding the table and references in the certification process have been revised to clarify that the features contained within the table are only required where specified in the National Rater Design Review Checklists and National Rater Field Checklists, and all common space applicability notes have been removed.
- Exhibits 2 and 4, the Mandatory Requirements for All Certified Buildings and ASHRAE and Prescriptive Path MRO Documents, have been combined and also revised to require all paths to complete the Multifamily Workbook and

Catch our final session!

Level up with ENERGY STAR NextGen: Program Updates and Rater Training
Tuesday 4:00 PM at Joshua Tree – Zak Shadid, Dylan Tindall (the BER)

Thank you!

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