

Speaking

Dean Gamble

Technical Manager
ENERGY STAR Certified Homes Program





Overview of Rev. 11

2020 Residential New Construction Partner Meeting

Dean Gamble

November 12, 2020

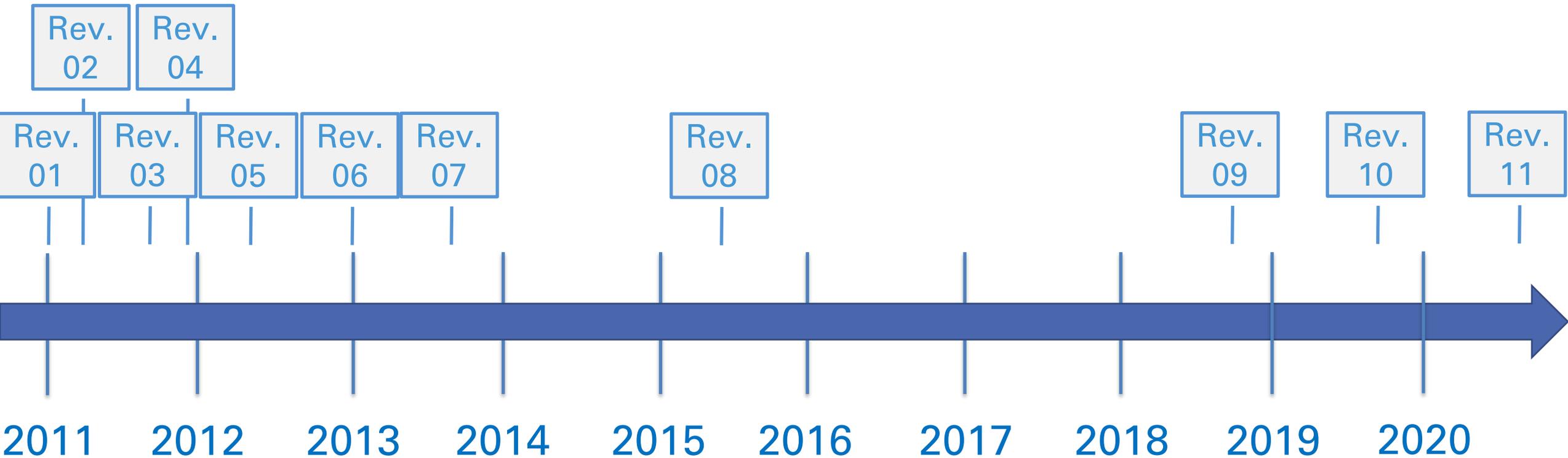
What is a Revision?

1 It clarifies

2 It simplifies

3 It improves

What is a Revision?



1/3 reduction in rater tasks!



Overview of Rev. 11

Revision themes

- **Rev. 08** - Is Great
- **Rev. 09** - It's Fine
- **Rev. 10** - Here comes 310 (aka ANSI/RESNET/ACCA 310 - HVAC grading)
- **Rev. 11** - Multifamily Succession

#1. Multifamily projects transitioning to MFNC

- Updated program name to reflect multifamily transition:

ENERGY STAR Single-Family New Homes Program

- For projects permitted on or after **July 1, 2021**, program eligibility for Single-Family New Homes becomes:
 - Dwellings (e.g. single-family homes, duplexes)
 - Townhouses
- All other multifamily projects will be certified using the Multifamily New Construction Program.

#1. Multifamily projects transitioning to MFNC

Present Eligibility ('Certified Homes' Program)

Multifamily projects moving to MFNC program



Single-Family



Duplex



Townhouse



Low-Rise MF

Eligibility for Permits on or after 07/01/21 ('Single-Family New Homes' Program)



Single-Family



Duplex



Townhouse

Townhouses can be certified under either program

#1. Multifamily projects transitioning to MFNC

- Revised eligibility requirements:

Eligibility Requirements

The following site-built or modular ¹ homes are eligible to earn the ENERGY STAR:

- Dwellings ² (e.g., single-family homes, duplexes)
- Townhouses ³

Dwelling Units in certain low-rise multifamily buildings are also eligible to earn the ENERGY STAR through this program if permitted prior to July 1, 2021. See Footnote 4 for details. ⁴

For information about other ENERGY STAR residential new construction programs, visit www.energystar.gov/newhomesrequirements.

Note that compliance with these requirements is not intended to imply compliance with all local code requirements.⁵

- Older eligibility requirements for multifamily projects will be retained in the footnotes, for reference.

Footnotes:

If permitted prior to July 1, 2021, the following are also eligible to earn the ENERGY STAR through the ENERGY STAR Single-Family New Homes program:

- Dwelling units ² in any multifamily building with 4 units or fewer; OR
- Dwelling units in multifamily buildings with 3 stories or fewer above-grade; OR
- Dwelling units in multifamily buildings with 4 or 5 stories above-grade where dwelling units occupy 80% or more of the occupiable square footage of the building. When evaluating mixed-use buildings for eligibility, exclude commercial / retail space when assessing whether the 80% threshold has been met.

#2. Collection of ventilation improvements

Goals

- A. Allow continuous return-side systems (e.g., inline fans), as long as they don't require continuous operation of the HVAC fan.
- B. More clearly define requirements for return-side inlets.
- C. Make three minor refinements.
- D. Add a new alternative compliance option for MFNC program.

Bonus content: just applies to MFNC

#2A. Allow most continuous return-side systems

Background:

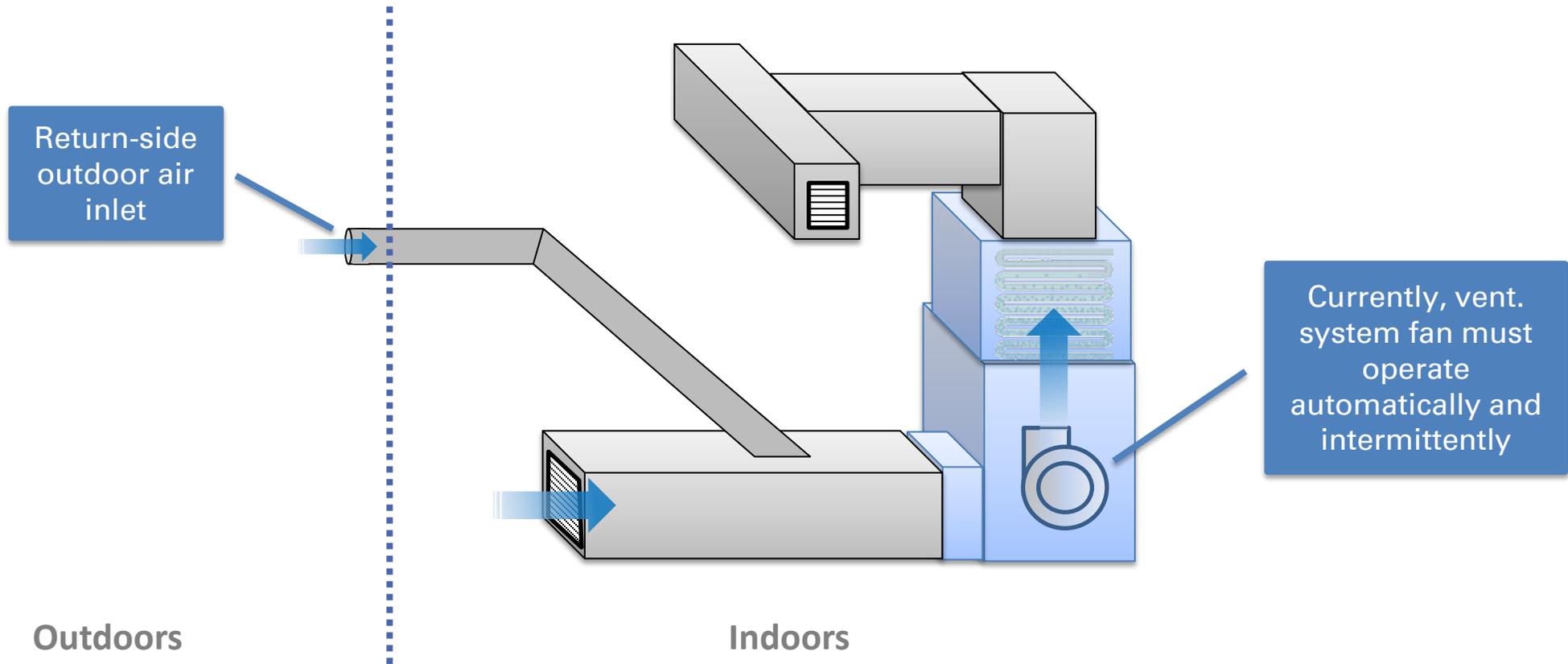
- Currently, Item 7.3 prohibits outdoor air inlets connected to the return side of the HVAC system, unless controls are installed to operate intermittently and automatically:

7.3 No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper).

- The intent is to limit energy consumption by not allowing the HVAC fan to run continuously.

#2A. Allow most continuous return-side systems

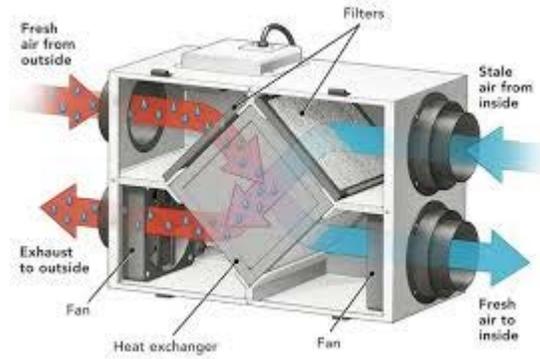
Background:



#2A. Allow most continuous return-side systems

Background:

- It's become more common to have continuous systems connected to the return that don't require continuous operation of the HVAC fan:



ERV



Inline Fan

- Some ventilation systems can control the HVAC fan even when the vent system has its own fan. Even in these cases, we don't want the HVAC fan to run continuously and be an energy hog.

#2A. Allow most continuous return-side systems

Revised Policy:

- The HVAC fan runtime requirement in Item 7.3 has been moved to Item 7.5.
- Clarified that the ventilation system controller cannot operate the HVAC fan continuously.

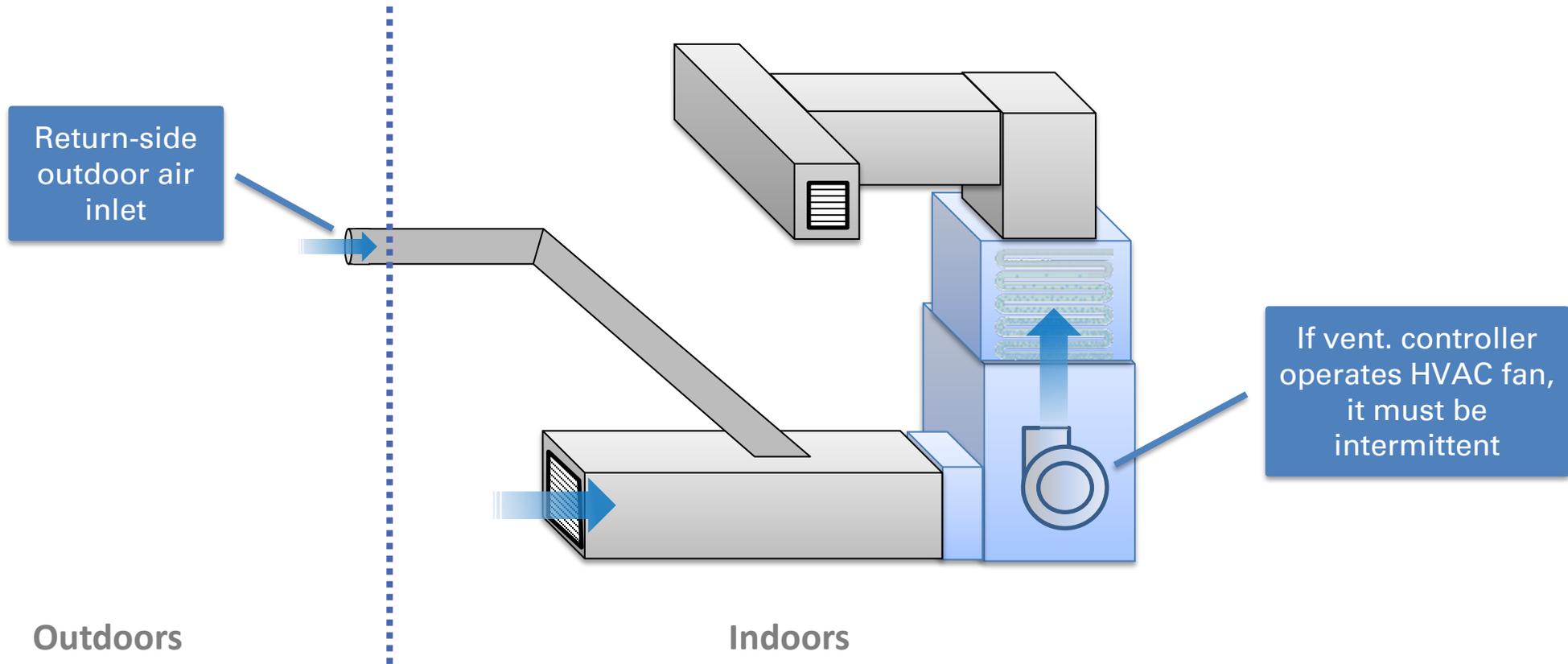
7.5 If ~~system utilizes Vent System controller operates~~ the HVAC fan, then HVAC fan operation is intermittent and either the ~~specified~~ fan type is ECM / ICM (4.7), or the controls will reduce the ~~standalone ventilation~~ run-time by accounting for HVAC system hours when the HVAC system is heating or cooling hours.⁵¹

- A new Footnote has been added with an example to reinforce intent:

Note that the 'fan-on' setting of a thermostat would not be an acceptable controller because it would continuously operate the HVAC fan.

#2A. Allow most continuous return-side systems

Revised Policy:



#2B. More clearly define requirements for return-side inlets

Background:

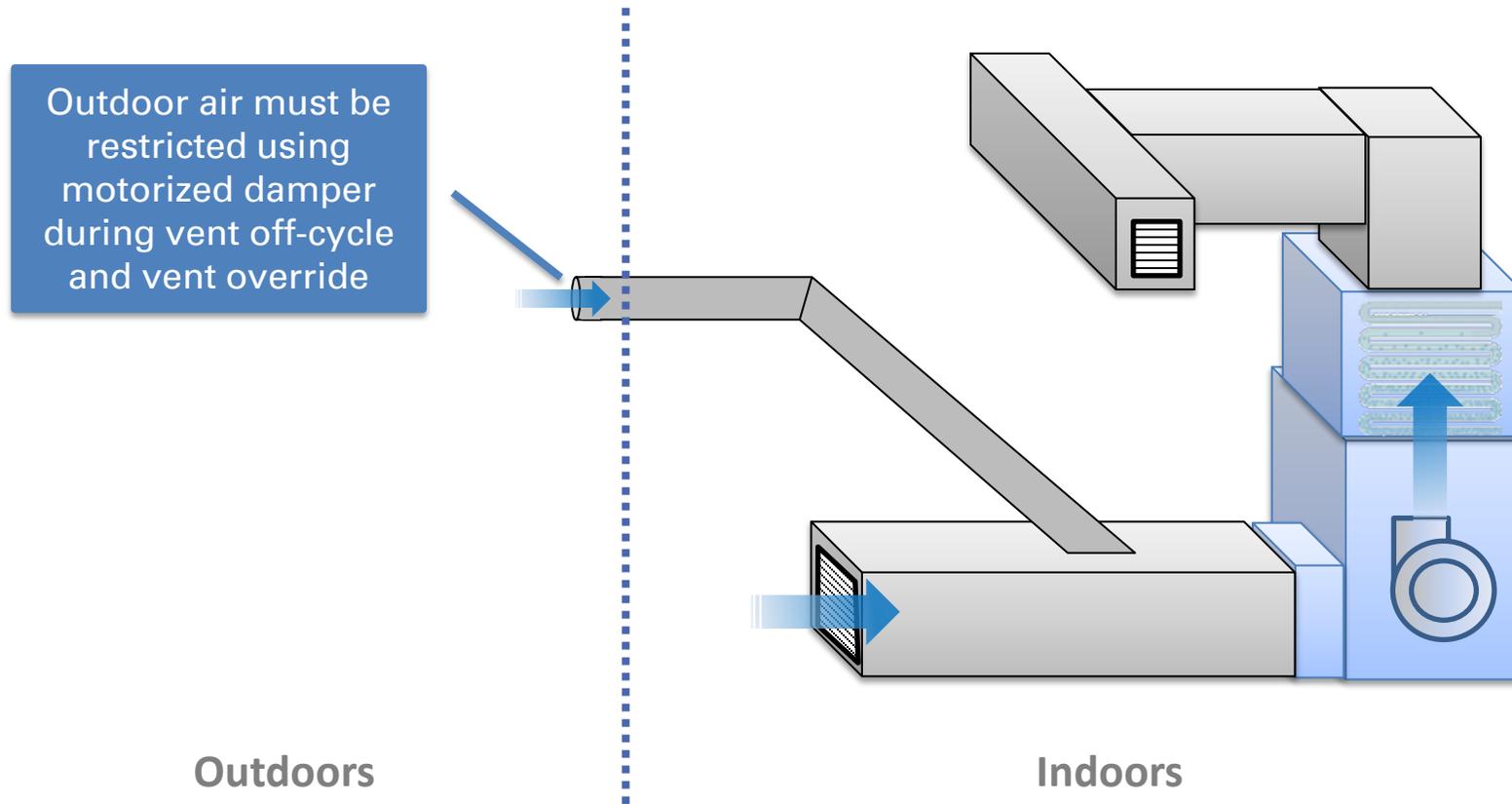
- Currently, for return-side inlets, Item 7.3 also requires that outdoor air be restricted when the system is “not in use”:

7.3 No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper).

- The intent is to restrict outdoor air when the ventilation system is:
 - In an off-cycle (not applicable to continuous systems), and,
 - If an occupant override has occurred.
- Also, the intent is for a motorized damper to be used to restrict this airflow.

#2B. More clearly define requirements for return-side inlets

Background:



#2B. More clearly define requirements for return-side inlets

Background:

- Air inlets on the return-side might be used as a dedicated source of air for an exhaust ventilation system.
- This is acceptable if the inlet can:
 - Automatically restrict airflow during ventilation off-cycles and occupant overrides, and,
 - Not bring in significantly more outdoor air than is being exhausted, which could happen because the inlet is closer to the powerful HVAC fan than the bath fan.

#2B. More clearly define requirements for return-side inlets

Revised Policy:

- Item 7.3 has been revised to capture these two requirements for return-side air inlets:
 - Use a motorized damper to restrict airflow during ventilation off-cycle and occupant override.
 - Verify that the ventilation rate is ≤ 15 CFM or 15% above the design value at the highest HVAC fan speed.

7.3 For any outdoor air inlet connected to a ducted return of the HVAC system (Complete if present; otherwise check "N/A"): ⁴⁸

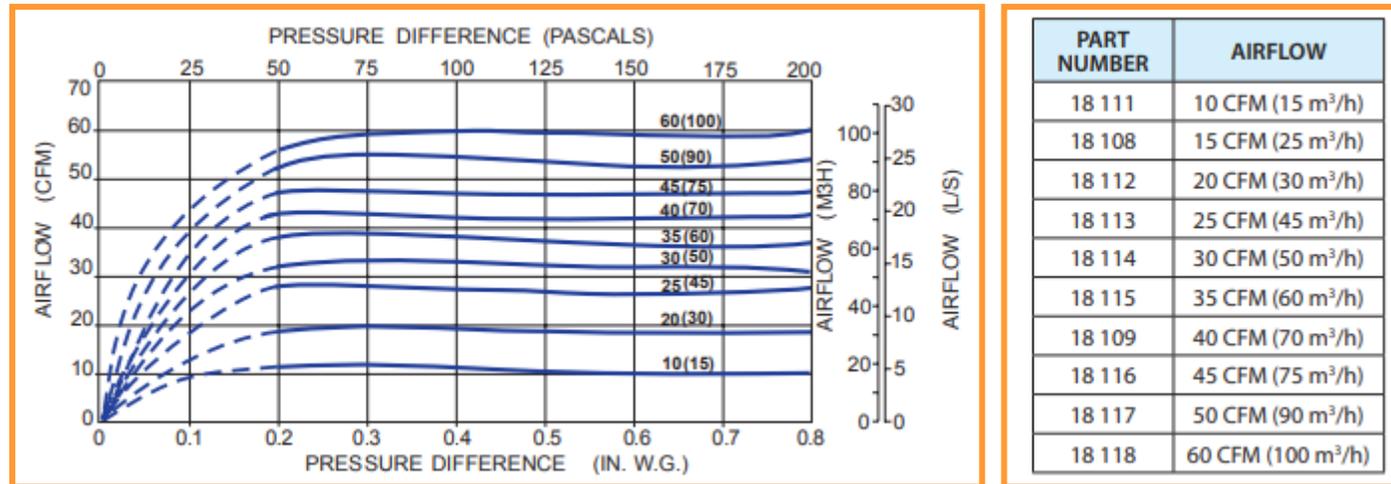
7.3.1 Controls automatically restrict airflow using a motorized damper during vent. off-cycle and occupant override. ⁴⁸

7.3.2 Rater-measured vent. rate is ≤ 15 CFM or 15% above design value at highest HVAC fan speed. Alt. in Fn. 49. ⁴⁹

#2B. More clearly define requirements for return-side inlets

Revised Policy:

- As an alternative to measuring the airflow, a Constant Airflow Regulating (CAR) damper could be used. CAR dampers are designed to limit the airflow through them to a known rate.



- Therefore, installing such a damper would ensure that the program's intent is met even without a measurement of the airflow.

#2B. More clearly define requirements for return-side inlets

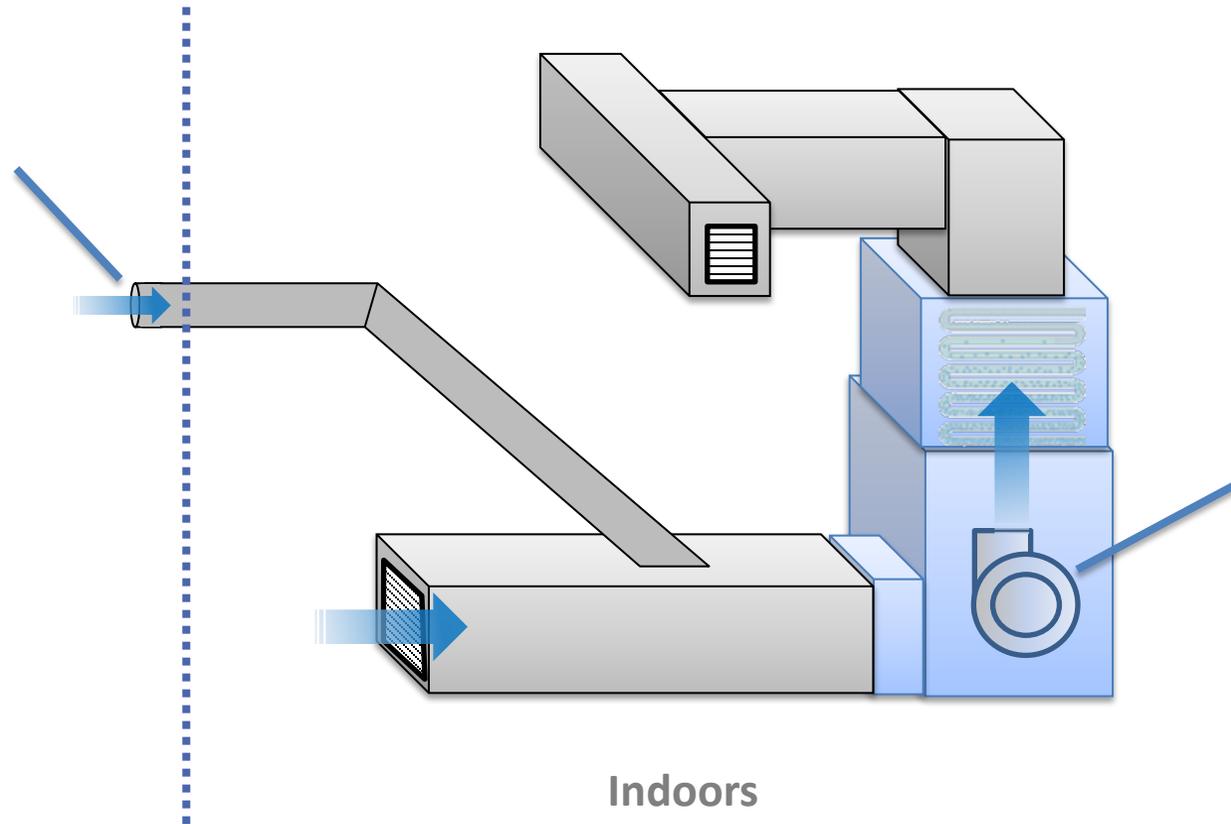
Revised Policy:

Any outdoor air inlet connected to ducted return must:

Restrict airflow during vent. off-cycles and over-rides using a motorized damper..

..and Rater-measured airflow must be ± 15 CFM or $\pm 15\%$ of design airflow.

Outdoors



In this example, the HVAC fan is the ventilation system fan

Indoors

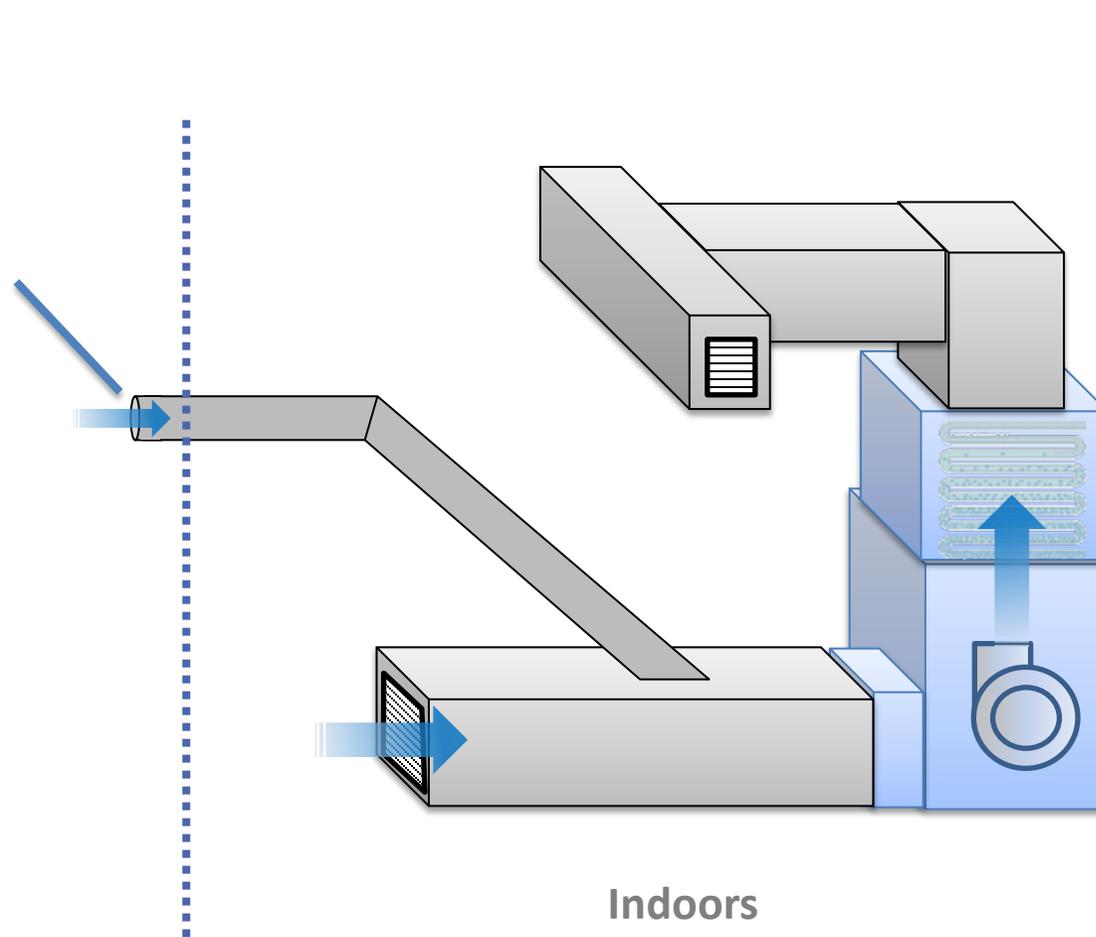
#2B. More clearly define requirements for return-side inlets

Revised Policy:

Any outdoor air inlet connected to ducted return must:

Restrict airflow during vent. off-cycles and over-rides using a motorized damper..

..and Rater-measured airflow must be <15 CFM or 15% above design airflow, or have a CAR damper



In this example, an exhaust fan is the ventilation system fan, and the return-side inlet is just a dedicated source of outdoor air

Outdoors

Indoors

#2B. More clearly define requirements for return-side inlets

Revised Policy:

- To emphasize that Item 7.3 applies to all inlets connected to a ducted return, a new Footnote has been added, as follows:

Item 7.3 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.

- To provide examples of when the airflow must be restricted on the return-side outdoor air inlet, a new Footnote has been added:

For example, if an outdoor air inlet connected to a ducted return is used as a dedicated source of outdoor air for an exhaust ventilation system (e.g., bath fan), the outdoor airflow must be automatically restricted when the exhaust fan is not running and in the event of an override of the exhaust ventilation system.

#2B. More clearly define requirements for return-side inlets

Revised Policy:

- To provide guidance on when and how to measure the airflow through the return-side outdoor inlet, and to add the alternative use of the CAR damper in lieu of measurement, a new Footnote has been added:

When assessing the ventilation rate, the highest HVAC fan speed applicable to ventilation mode shall be used (e.g., if the inlet only opens when the HVAC is in 'fan-only' mode, then test in this mode). If the inlet has a motorized damper that only opens when the local mechanical kitchen exhaust is turned on, then testing is not required.

When required, the ventilation airflow through the inlet shall be measured and documented by a Rater using ANSI / RESNET / ICC Std. 380 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the schedule defined by the HCO that the home is being certified under. As an alternative, measurement of the outdoor airflow can be waived if a Constant Airflow Regulating (CAR) damper with a manufacturer-specified maximum flow rate no higher than 15 CFM or 15% above the ventilation design value is installed on the inlet

#2C. Three minor refinements

Revised Policy:

- Section 7 header revised to align with ANSI / RESNET / ICC 301 terminology and to emphasize that it applies to inlets connected to a ducted return of the HVAC system, regardless of intent:

7. Whole House Dwelling Unit Mechanical Ventilation Systems (“Vent System”) ⁴⁵ & Inlets In Return Duct ⁴⁶

- A new Footnote defines “Dwelling Unit Mechanical Ventilation System:

As defined by ANSI / RESNET / ICC Std. 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

- And the new Footnote regarding return-side inlets is referenced:

Item 7.3 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.

#2C. Three minor refinements

Revised Policy:

- To provide a clearer example of a ventilation override control that must be labeled because its function is not obvious, Item 7.2 has been refined:

A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a ~~standalone toggle~~ wall switch, but not for a switch that's on the ventilation equipment.



What does this switch do?

A toggle wall switch is one clear example of an override that needs a label so the occupant understands what it does

#2C. Three minor refinements

Revised Policy:

- To reduce confusion, all instances of “intake” have been changed to “inlet” when referring to the point of entry for outdoor air.

#2D. MFNC only: Alternative to motorized damper

Background:

- Many dwelling units use an exhaust ventilation system (e.g., bath fan with controller) as a low-cost way to comply with the program.
- With no dedicated source of outdoor air, more air may come from adjacent dwelling units than directly from outside.
- Adding an inlet to the return-side of the HVAC system can provide a low-cost dedicated source of outdoor air, but a motorized damper is often cost-prohibitive for multifamily projects. Particularly if the bath fan is continuous, so that the damper is only used during occupant overrides.

#2D. MFNC only: Alternative to motorized damper

Revised Policy:

- Just for the MFNC program, an alternative compliance option has been added. It allows an inlet without a motorized damper on the ducted return of the dwelling unit HVAC system if:
 - It's paired with a continuous exhaust ventilation system, and,
 - A manual shutoff damper is readily-accessible, labeled as the override, and not used as a balancing damper
- This alternative has been added to a Footnote in the MFNC program:

In dwelling / sleeping units in multifamily buildings, but not townhouses, automatic restriction of airflow is exempted if a manual shutoff damper is used with a continuous exhaust ventilation system and is readily-accessible, labeled as the override, and not used as a balancing damper.

#2D. MFNC only: Alternative to motorized damper

Revised Policy:

- In multifamily dwelling units, this relatively low-cost solution will likely perform meaningfully better than an exhaust ventilation system without a dedicated outdoor air inlet.
- This allowance was not added to the ENERGY STAR single-family homes program. These homes have more or all exposed walls, such that an exhaust ventilation system will already primarily draw air directly from the outside (not adjacent units).

#2. Collection of ventilation improvements

Key points:

- Change: A continuous return-side system (e.g., inline fan) can be used, as long as it doesn't operate the HVAC fan continuously.
- Change: The ventilation controller cannot operate the HVAC fan continuously.
- Clarification: Any outdoor air inlet connected to a ducted return must restrict airflow when the vent. system is not operating and if the occupant overrides the system.
- Change: If an inlet connected to a ducted return is not part of the vent. system, it still needs to restrict airflow and the airflow either measured or a CAR damper added.
- Change for MFNC: Dwelling / sleeping units with a continuous exhaust vent. system and an inlet connected to a ducted return can use a manual shutoff damper if it's readily-accessible, labeled as the override, and not used as a balancing damper, in lieu of a motorized damper.

#4. Only vent. ducts connected to HVAC system must be tested

- Currently, duct leakage testing is generally required for heating, cooling, and balanced ventilation ducts.
- Balanced ventilation ducts are exempted if they're not connected to the space heating or cooling system. A visual inspection is required instead.
- The Footnote for Item 2.4 and 2.5 of the RFC has been clarified to address other ventilation system types (i.e., supply and exhaust):

“Items 2.4 & 2.5 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 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.

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.”

#5. All impermeable surfaces must meet slope requirements

- Item 1.1 and 1.2 of the Water Management System Builder Requirements reference several specific examples of impermeable and permeable surfaces that must be sloped.
- However, the intent is that any impermeable and permeable surface should meet these slope requirements.
- These Items have been revised to be more broadly applicable:

Item 1.1: “Impermeable surfaces (e.g., patio, porch, or plaza slabs; sidewalks; ramps; driveways), sloped ≥ 0.25 in. per ft. away from building to edge of surface or 10 ft., whichever is less.”

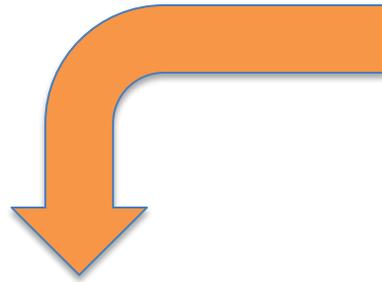
Item 1.2: “Back-fill has been tamped, and permeable surfaces sloped ≥ 0.5 in. per ft. away from building for ≥ 10 ft. Alternatives in Footnote.”

#6. Bedroom pressure testing for multi-zone HVAC

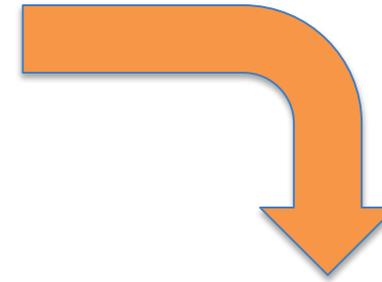
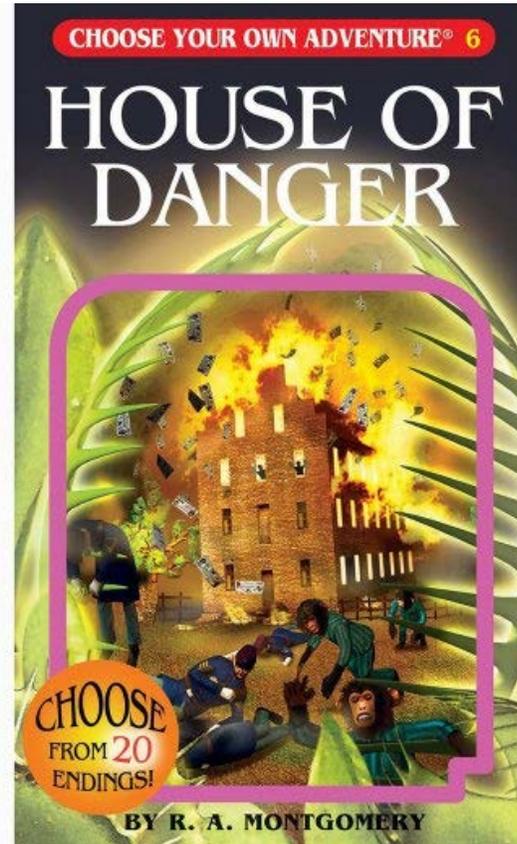
- Item 6.2 of the Rater Field Checklist requires bedrooms to be pressure-balanced.
- In the referenced Footnote, the test procedure for multi-zone HVAC has been clarified:

“For an HVAC system with multiple zones, this requirement shall be verified with all zones calling for heating or cooling simultaneously; additional testing of individual zones is not required.”

#7. The term 'path' replaced with 'track' regarding HVAC reqs.



Track A:
HVAC
Grading



Track B:
HVAC
Credential

What we didn't cover today

- Updates that reinforce the obvious
- Updates with narrow application
- General cleanup of language and references

Release of Revision 11

- Will be released in November 2020:
 - Updated program documents.
 - Updated Policy Record.
 - Tracked-changes documents.



ENERGY STAR Single-Family New Homes National Program Requirements

National Program Requirements ENERGY STAR Single-Family New Certified Homes, Version 3.1 (Rev. 110)

Eligibility Requirements

The following site-built or modular ¹ homes are eligible to earn the ENERGY STAR:

- Detached dwelling units ² (e.g., single-family homes, duplexes); OR
- Townhouses ^{3a}
- Dwelling units ² in any multifamily building with 4 units or fewer; OR
- Dwelling units ² in multifamily buildings with 3 stories or fewer above grade ^{2a}; OR
- Dwelling units ² in multifamily buildings with 4 or 5 stories above grade ^{2a} where dwelling units occupy 90% or more of the occupiable ⁴ square footage of the building ⁴. When evaluating mixed-use buildings for eligibility, exclude commercial / retail space when assessing whether the 90% threshold has been met.

Dwelling Units in certain low-rise multifamily buildings are also eligible to earn the ENERGY STAR through this program if permitted prior to July 1, 2021. See Footnote 4 for details. ^{4a}

For information about other ENERGY STAR residential new construction programs, visit www.energystar.gov/newhomesrequirements.

Note that compliance with these requirements is not intended to imply compliance with all local code requirements that may be applicable to the home to be built. ^{5a}

Partnership, Training, and Credentialing Requirements

The following requirements must be met prior to certifying homes:

- Builders are required to sign an ENERGY STAR Partnership Agreement and complete the online Version 3 Builder Orientation, which can be found at www.energystar.gov/homesPA.
- HVAC installing contractors are required to be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) for homes certified using Path B Track B in Exhibit 2. An explanation of this process can be found at www.energystar.gov/newhomesHVAC.
- Energy Rating Companies (e.g., rater companies and Providers ^{6a}) are required to sign an ENERGY STAR Partnership Agreement, which can be found at www.energystar.gov/homesPA, and Raters ^{7a} are required to complete EPA-recognized training, which can be found at www.energystar.gov/newhomestraining.

ENERGY STAR Certification Process

1. The certification process provides flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design Home, Exhibit 1, as assessed through energy modeling. An EPA-recognized Verification Oversight Organization (VOC) Home Certification Organization (HCO)'s Approved Software Rating Tool shall automatically determine the ENERGY STAR ERI Target, which is the highest ERI value that each rated home may achieve to earn the ENERGY STAR ER-1.
2. Using the same software program, configure the preferred set of efficiency measures for the home to be certified and verify that the resulting ERI meets or exceeds the ENERGY STAR ERI Target, as determined in Step 1.
Note that, regardless of the measures selected, the Mandatory Requirements for All Certified Homes in Exhibit 2 are also required and impose certain constraints on the efficiency measures selected (e.g., insulation levels, insulation installation quality, window performance, duct leakage). Furthermore, on-site power generation may not be used to meet the ENERGY STAR ERI Target.
3. Construct the home using the measures selected in Step 2 and the Mandatory Requirements for All Certified Homes, Exhibit 2.
4. Using a Rater, verify that all requirements have been met in accordance with the Mandatory Requirements for All Certified Homes and with the on-site inspection procedures for minimum rated features in ANSI / RESNET / ICC Standard 301 Appendix B of an EPA-recognized VOC. ¹⁰ For modular homes, a Rater must verify any requirement in the plant not able to be verified on-site because a

Implementation of Revision 11

- Implementation date of 01/01/2022.
- What does this mean for you?
 - You can use Rev. 11 upon release for any home.
 - You must use Rev. 11 for any home permitted after January 1, 2022.

Summary of Rev. 11: Multifamily Succession

- Top seven changes in Rev. 11:
 1. Multifamily projects transitioning to MFNC
 2. Collection of ventilation improvements
 3. Expansion of National Version 3.1 implementation
 4. Only vent. ducts connected to HVAC system must be tested
 5. All impermeable surfaces must meet slope requirements
 6. Bedroom pressure testing for multi-zone HVAC
 7. “Path” replace with “Track”
- Available for use 11/2020; required for use after 01/2022



Q & A

ENERGY STAR Residential New Construction

Web & Email:

Single Family: www.energystar.gov/newhomesrequirements

Multifamily: www.energystar.gov/mfnc

Email: energystarhomes@energystar.gov

Dean Gamble

Technical Manager

ENERGY STAR SF New Construction

gamble.dean@epa.gov