What is a Revision?

1. It clarifies
2. It simplifies
3. It improves
What is a Revision?

1/3 reduction in rater tasks!
Revision themes

- Rev. 08 - Is Great
- Rev. 09 - It’s Fine
- Rev. 10 - Here comes 310 (aka ANSI/RESNET/ACCA 310 - HVAC grading)
#1. Integration of HVAC grading compliance path

- Nearly 10 years of proper HVAC design and install in ENERGY STAR.
- Tons of progress, but remaining challenges:
  - All your good work has zero impact on HERS score / ERI value
  - Credentialed contractors hard to find in small markets
  - ENERGY STAR-only requirements make the program a bigger lift
- Rev. 10 introduces a new alternative compliance path for HVAC.
- New path is based on ANSI/RESNET/ACCA Std. 310.
## Current HVAC Compliance Path

<table>
<thead>
<tr>
<th>Party Responsible</th>
<th>Path B: HVAC Credential</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC designer completes..</td>
<td>• ENERGY STAR HVAC Design Report</td>
</tr>
<tr>
<td>Rater reviews design report per..</td>
<td>• ENERGY STAR Design Review Chkl.</td>
</tr>
<tr>
<td>Rater verifies..</td>
<td>• HVAC contractor is credentialed</td>
</tr>
</tbody>
</table>
| HVAC contractor..                  | • Installs equipment  
  • Completes ES HVAC Commiss. Chkl. |
| Rater verifies..                   | • Total duct leakage limits  
  • Static pressure  
  • Permitted to collect ENERGY STAR HVAC Commissioning Checklist |
Before Revision 10

Path B:
HVAC Credential

 ENERGY STAR
With Revision 10 & Future Revisions

Path A: HVAC Grading

Path B: HVAC Credential
Std. 310: Standard for Grading the Installation of HVAC Systems
# Alternative HVAC Compliance Path

## Party Responsible

<table>
<thead>
<tr>
<th>Party Responsible</th>
<th>Path A: HVAC Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC designer completes</td>
<td>• Std. 310 HVAC Design Report + ENERGY STAR Supplement</td>
</tr>
<tr>
<td>Rater reviews design report per.</td>
<td>• Std. 310 Design Review Checklist + ENERGY STAR Supplement</td>
</tr>
<tr>
<td>HVAC contractor..</td>
<td>• Installs equipment</td>
</tr>
<tr>
<td>Rater verifies..</td>
<td>• Grade I total duct leakage</td>
</tr>
<tr>
<td></td>
<td>• Grade I or II blower fan airflow</td>
</tr>
<tr>
<td></td>
<td>• Grade I or II blower fan watt draw</td>
</tr>
<tr>
<td></td>
<td>• Grade I refrigerant charge*</td>
</tr>
</tbody>
</table>

*If non-invasive test can be done during final inspection*
<table>
<thead>
<tr>
<th>Party Responsible</th>
<th>Path A: HVAC Grading</th>
<th>Path B: HVAC Credential</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC designer completes..</td>
<td>• Std. 310 HVAC Design Report + ENERGY STAR Supplement</td>
<td>• ENERGY STAR HVAC Design Report</td>
</tr>
<tr>
<td>Rater reviews design report per..</td>
<td>• Std. 310 Design Review Checklist + ENERGY STAR Supplement</td>
<td>• ENERGY STAR Design Review Chkl.</td>
</tr>
<tr>
<td>Rater verifies..</td>
<td>• [n/a]</td>
<td>• HVAC contractor is credentialed</td>
</tr>
</tbody>
</table>
| HVAC contractor.. | • Installs equipment | • Installs equipment  
• Completes ES HVAC Commiss. Chkl. |
| Rater verifies.. | • Grade I total duct leakage  
• Grade I or II blower fan airflow  
• Grade I or II blower fan watt draw  
• Grade I refrigerant charge* | • Total duct leakage limits  
• Static pressure  
• Permitted to collect ENERGY STAR HVAC Commissioning Checklist |
## Program Requirements Document

### National Program Requirements
**ENERGY STAR Certified Homes, Version 3.1 (Rev. 10)**

Two paths are provided for satisfying the mandatory requirements for all certified homes. Exhibit 2. Path A - HVAC Grading utilizes ANSI / RESNET / ACCA Std. 310, a standard for grading the installation of HVAC systems. Path B - HVAC Credential utilizes an HVAC contractor credentialed by an EPA-recognized H-CERT. Either path may be selected, but all requirements within that path must be satisfied for the home to be certified.

#### Exhibit 2: Mandatory Requirements for All Certified Homes

<table>
<thead>
<tr>
<th>Party Responsible</th>
<th>Mandatory Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirements Applicable to Path A &amp; B</strong></td>
<td></td>
</tr>
<tr>
<td>Rater</td>
<td>• Completion of National Rater Design Review Checklist, Version 3 / 3.1</td>
</tr>
<tr>
<td></td>
<td>• Completion of National Rater Field Checklist, Version 3 / 3.1</td>
</tr>
<tr>
<td>Builder</td>
<td>• Completion of National Water Management System Builder Requirements, Version 3 / 3.1</td>
</tr>
<tr>
<td><strong>Requirements Only Applicable to Path A – HVAC Grading</strong></td>
<td></td>
</tr>
<tr>
<td>HVAC System Designer</td>
<td>• Completion of an HVAC design report compliant with ANSI / RESNET / ACCA Std. 310, plus the ENERGY STAR Supplement</td>
</tr>
<tr>
<td>HVAC Installing Contractor</td>
<td>• None. While the HVAC contractor plays a critical role in properly installing and commissioning a system, the Rater is the party responsible for assessing its installation quality in accordance with ANSI / RESNET / ACCA Std. 310.</td>
</tr>
<tr>
<td><strong>Requirements Only Applicable to Path B – HVAC Credential</strong></td>
<td></td>
</tr>
<tr>
<td>HVAC System Designer</td>
<td>• Completion of National HVAC Design Report, Version 3 / 3.1</td>
</tr>
<tr>
<td>HVAC Installing Contractor</td>
<td>• Completion of National HVAC Commissioning Checklist, Version 3 / 3.1</td>
</tr>
</tbody>
</table>
Rater Design Review Checklist
### Rater Field Checklist

**National Rater Field Checklist**

**ENERGY STAR Certified Homes, Version 3 / 3.1 (Rev. 10)**

<table>
<thead>
<tr>
<th>HVAC System</th>
<th>Must Correct</th>
<th>Rater Verified</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Heating &amp; Cooling Equipment - Complete Path A - HVAC Grading or Path B - HVAC Credential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Path A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a.1 Blower fan volumetric airflow is Grade I or II per ANSI / RESNET / ACCA Std. 310.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a.2 Blower fan watt draw is Grade I or II per ANSI / RESNET / ACCA Std. 310.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a.3 Refrigerant charge is Grade I per ANSI / RESNET / ACCA Std. 310. See Footnote 33 for exemptions.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Path B | | | |
| 5b.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): | | | |
| | National HVAC Design Report (4.3, 4.4 & 4.17) | Written approval received from designer | |
| 5b.2 External static pressure measured by Rater at contractor-provided test locations and documented below. | IWC | Supply Side External Static Pressure: | IWC |

5b.3 Permitted, but not recored: National HVAC Commissioning Checklist collected, with no items left blank. | | | |

6. Duct Quality Installation (Applies to Heating, Cooling, Ventilation, Exhaust, & Pressure Balancing Ducts, Unless Noted in Footnote) | | | |
| 6.1 Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork. | | | |
| 6.2 Bedrooms pressure-balanced by using transfer outlets, supply ducts, dedicated return ducts, or under-frame (in) | | | |
#1. Integration of HVAC grading compliance path

- **Key benefits of Path A – HVAC Grading:**
  - Potential for extra points in energy ratings.
  - Use of credentialed contractor is not mandatory.
  - Fewer ENERGY STAR-specific requirements to certify a home.

- **Key takeaways for Path A - HVAC Grading:**
  - Can’t be used until Std. 310 is finished.
  - Once Std. 310 is finished, this path will be optional.

- **Key action items for you today:**
  - For now, continue certifying homes using Path B.
  - Be prepared for more information about Path A in the first half of 2020.
  - Review the draft Std. 310, if desired.
#2. Updated HVAC Design Outdoor Temp Limits

Example for a county with a cooling limit of 95 F

Lower than or equal to 95 F is allowed

Higher than 95 F is not allowed
#2. Updated HVAC Design Outdoor Temp Limits

- 1st improvement: Using newly released weather data.
#2. Updated HVAC Design Outdoor Temp Limits

- 2nd improvement: Improved methodology
  - Now use all weather stations within 40 miles of the center of each county.
  - This eliminates the ‘island’ effect in many cases.
#2. Updated HVAC Design Outdoor Temp Limits

- The updated design temps are called the “2019 Edition”, while the original design temps are now called the “2015 Edition”.
- 95% of the cooling limits in the 2019 Edition are equal or less stringent than the 2015 Edition.
- For a home using Path A - HVAC Grading, the 2019 Edition will be used.
- For a home using Path B - HVAC Credential:
  - An ENERGY STAR HVAC Design Report created after the Rev. 10 release date (11/2019) is allowed to use these new limits.
  - An ENERGY STAR HVAC Design Report created after the Rev. 10 implementation date (10/2020) is required to use these new limits.
#3. Alignment of duct leakage test exemptions

- Two program-specific exemptions to duct leakage to outside testing have been aligned with ANSI/RESNET/ICC 301 and 380.
- Reduces the number of program-specific policies and improves clarity.
• **Fn. 41**: Testing of duct leakage to the outside can be waived if:

1. All ducts & air handling equipment are located within the home’s air and thermal barriers AND infiltration does not exceed the following:

<table>
<thead>
<tr>
<th>CZ 1-2</th>
<th>CZ 3-4</th>
<th>CZ 5-7</th>
<th>CZ 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 ACH50</td>
<td>2.5 ACH50</td>
<td>2.0 ACH50</td>
<td>1.5 ACH50</td>
</tr>
</tbody>
</table>

2. Alternatively, testing of duct leakage to the outside can be waived if total duct leakage is $\leq 4 \text{ CFM25 per 100 sq. ft. of conditioned floor area}$ or $40 \text{ CFM25}$, whichever is larger.
#3. Alignment of duct leakage test exemptions

- **Revised Fn. 41**: Testing of duct leakage to the outside can be waived if:
  1. The 2nd alternative of Std. 301, Table 4.2.2 (1), footnote (w), is met.
  2. The 3rd alternative of Std. 301, Table 4.2.2 (1), footnote (w), is met.
  3. In accordance with Section 5.5.2 of ANSI / RESNET / ICC Std. 380, the total duct leakage, at rough-in or final, is \( \leq 4 \text{ CFM25 per 100 sq. ft. of CFA} \) or \( \leq 40 \text{ CFM25} \), whichever is larger.
<table>
<thead>
<tr>
<th>Applicable House Types:</th>
<th>Dwellings and Townhouses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct Test Required:</td>
<td>Total duct leakage test at pre-drywall or final</td>
</tr>
<tr>
<td>Duct Test Exemption:</td>
<td>No leakage to outside duct test required</td>
</tr>
</tbody>
</table>
| Prerequisites:         | 1) At a pre-drywall stage of construction, 100% of the ductwork and air handler shall be visible and visually verified to be contained inside the Infiltration Volume.  
2) At a pre-drywall stage of construction, the ductwork shall be visually verified to be 100% fully ducted, with no building cavities used as supply or return ducts.  
3) At either a pre-drywall stage of construction or a final stage of construction, airtightness of the duct system shall be tested in accordance with requirements of Standard ANSI/RESNET/ICC 380 Total Duct Leakage Test (Section 4.4.1). The total leakage shall be: |
|                        | # Returns | Leakage Limit |
|                        | < 3       | Larger of 4 CFM per 100 sq. ft. of CFA or 40 CFM |
|                        | ≥ 3       | Larger of 6 CFM per 100 sq. ft. of CFA or 60 CFM |
| Modeling Impact:       | Leakage to outside shall be assigned 1/2 of the measured total duct leakage |

# Returns | Leakage Limit |
--- | --- |
< 3 | Larger of 4 CFM per 100 sq. ft. of CFA or 40 CFM |
≥ 3 | Larger of 6 CFM per 100 sq. ft. of CFA or 60 CFM |

4) At a final stage of construction, ductwork that is visible and the air handler shall again be verified to be contained in the Infiltration Volume.  
5) At a final stage of construction, airtightness of the Rated Home shall be tested in accordance with requirements of Standard ANSI/RESNET/ICC 380 and shall be ≤ 3 ACH50.
<table>
<thead>
<tr>
<th><strong>Applicable House Types:</strong></th>
<th>Attached Dwelling Units, excluding Dwellings and Townhouses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duct Test Required:</strong></td>
<td>Total duct leakage test at pre-drywall or final</td>
</tr>
<tr>
<td><strong>Duct Test Exemption:</strong></td>
<td>No leakage to outside duct test required</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Modeling Impact:</strong></td>
<td>Software shall calculate the energy impact using the total duct leakage results and prorating based on the percent of duct surface area that is not in Rated Home Conditioned Space Volume, plus a contribution from the associated air handler if located outside the Rated Home Conditioned Space Volume. The air handler contribution shall be a minimum of 2.5% of the supply airflow, where supply airflow is calculated as 400 cfm per 12,000 Btu/h of output capacity of the heating or cooling equipment. The sum of the duct leakage associated with duct surface area outside the Conditioned Space Volume and the air handler leakage shall not exceed the measured duct leakage from the entire duct system.</td>
</tr>
<tr>
<td><strong>ENERGY STAR Exemption 3 (Aligned with Std. 380, Section 5.5.2)</strong></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Applicable House Types:</strong></td>
<td>All Dwellings and Dwelling Units</td>
</tr>
<tr>
<td><strong>Duct Test Required:</strong></td>
<td>Total duct leakage test at pre-drywall or final</td>
</tr>
<tr>
<td><strong>Duct Test Exemption:</strong></td>
<td>No leakage to outside duct test required</td>
</tr>
<tr>
<td><strong>Prerequisites:</strong></td>
<td>None from RESNET, but ENERGY STAR will still require that the total duct leakage be ≤ 4 CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM25, whichever is larger.</td>
</tr>
<tr>
<td><strong>Modeling Impact:</strong></td>
<td>Leakage to outside shall be equal to the measured total duct leakage</td>
</tr>
</tbody>
</table>
#4. Clarified overlap between ENERGY STAR & code
#4. Clarified overlap between ENERGY STAR & code

Does an ENERGY STAR home meet code?

- No?
- Kinda?
- Yes?
#4. Clarified overlap between ENERGY STAR & code

- Program requirements already stated:
  
  “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.”

- Footnote 7, regarding code overlap, has been revised to state:
  
  “While certification will result in compliance with many code requirements, a Rater is not responsible for ensuring that all code requirements have been met prior to certification. For more information about how these program requirements help satisfy code requirements, visit: www.energystar.gov/newhomesguidance.”
#4. Clarified overlap between ENERGY STAR & code

- Factsheets available at: www.energystar.gov/newhomesguidance
- One page front and back
  - Front: Relevant code language and background.
  - Back: Listing of all mandatory requirements compared to ENERGY STAR.
- Created for:
  - Version 3 vs the 2009 IECC
  - Version 3.1 vs the 2012 and 2015 IECC
#5. Guidance on conditioned floor area and window area

- Designers and Raters sometimes use different approaches to calculating conditioned floor area and window area.
- That can slow down certification.
- New footnotes have been added to clarify these terms.
#5. Guidance on conditioned floor area and window area

- For Raters, on the Rater Design Review Checklist:
  - Conditioned Floor Area for the home to be certified shall be calculated in accordance with the definition in ANSI / RESNET / ICC Standard 301-2019.
  - Window area for the home to be certified shall be calculated in accordance with the on-site inspection protocol provided in Normative Appendix B of ANSI / RESNET / ICC Standard 301-2019.
#5. Guidance on conditioned floor area and window area

- For designers, on the HVAC Design Report, for CFA:
  - The difference between the Conditioned Floor Area (CFA) used in the design and the actual home to be certified must fall within the tolerance specified in Footnote 2, as verified by a Rater.
  - Be advised, the Rater will calculate CFA using the definition in ANSI / RESNET / ICC Standard 301-2019, which defines this value, in part, as the floor area of the Conditioned Space Volume within a building or Dwelling Unit, not including the floor area of attics, crawlspaces, and basements below air sealed and insulated floors.
  - See https://codes.iccsafe.org/content/chapter/16185/ for the complete definition.
#5. Guidance on conditioned floor area and window area

- For designers, on the HVAC Design Report, for window area:
  - The difference between the window area used in the design and the actual home to be certified must fall within the tolerance specified in Footnote 2, as verified by a Rater.
  - Be advised, the Rater will calculate window area using the on-site inspection protocol provided in Normative Appendix B of ANSI / RESNET / ICC Standard 301-2019, which instructs the Rater to measure the width and height of the rough opening for the window and round to the nearest inch, and then to use these measurements to calculate window area, rounding to the nearest tenth of a square foot.
  - See https://codes.iccsafe.org/content/chapter/16191/ for the complete protocol.
#6. Documentation of partnership status / credential

- Item 1.1 and 1.2 of the Rater Design Review Checklist already required the Rater to verify that the builder was an ENERGY STAR partner and the HVAC contractor was credentialed.
- For QA, we’ve clarified that Raters must document this verification.
- We’ve also clarified how often these checks need to be done:
  - Item 1.1: Once per builder, for first home Rater certifies for them.
  - Item 1.2: At least once every 12 months, per HVAC contractor.
#7. Infiltration verified for “total UA” insulation option

- A footnote has been added to Item 1.2 of the Rater Field Checklist that references the infiltration requirements that must be verified when Item 3.1.2 of the Rater Design Review Checklist has been selected.

### Rater Design Review Checklist

<table>
<thead>
<tr>
<th>3.1.1</th>
<th>Meets or exceeds 2009 IECC levels (^{5,6,7}) OR;</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.2</td>
<td>Achieves (\leq 133%) of the total UA resulting from the U-factors in 2009 IECC Table 402.1.3, per guidance in Footnote 5d, AND specified home infiltration does not exceed the following: (^{6,7})</td>
</tr>
</tbody>
</table>

\[
\begin{array}{c c c c c c}
3 \text{ACH}50 \text{ in CZs 1, 2} & 2.5 \text{ACH}50 \text{ in CZs 3, 4} & 2 \text{ACH}50 \text{ in CZs 5, 6, 7} & 1.5 \text{ACH}50 \text{ in CZ 8} \\
\end{array}
\]

### Rater Field Checklist

4. In addition, the infiltration shall not exceed the limits specified in Item 3.1.2 of the National Rater Design Review Checklist, if this option has been used to comply with Item 3.1.
#8. Requirements when mismatch between specified and installed HVAC equip.

- Footnote 34 of the Rater Field Checklist has been revised.

**Rater Design Review Checklist**

- “If specified equip. was [an] exempted type, “then the Rater shall verify that all installed equipment is an exempted type per Footnote 9 of that Checklist or..

- ..if not an exempted type, shall re-review the National Rater Design Review Checklist to ensure compliance with all requirements (e.g., contractor credential, full completion of HVAC Design Report, HVAC design tolerances).”
#9. All Energy Rating Companies required to be partners

- The National Program Requirements now explicitly require all Energy Rating Companies (e.g., rater companies and Providers) to sign an ENERGY STAR Partnership Agreement, found here: www.energystar.gov/homesPA
#10. Removal of old date-dependent policies

- Removing date dependent requirements if older than 3 years.
  - If permitted prior to July 1, 2012...
  - For homes permitted through 12/31/2012...
  - For a home certified in the State of ID, MT, OR, or WA that is permitted before 01/01/2016...

- Homes are unlikely to need these date-dependent policies, but if applicable they may still be used.
Final minor clean-up and formatting changes

- Last but not least!
Release of Revision 10

- Released in November 2019.
- Can be used immediately.
- Includes:
  - Revised program documents.
  - Updated Policy Record.
  - Mark-up documents with tracked changes.
  - One-page highlights document.

Visit: energystar.gov/newhomesrequirements
Implementation of Revision 10

• Implementation date of 10/01/2020.
• What does this mean for you?
  – You can use Rev. 10 for any home today.
  – You must use Rev. 10 for any home permitted after October 1, 2020.
• When certifying a home under Rev. 10:
  – Path A - the HVAC Grading path can only be used once Std. 310 is ready.
  – Path B - the HVAC Credential path can be used today.
    • In Path B, a Rev. 08, 09, or 10 ENERGY STAR HVAC Design Report may be used.
Summary of Rev. 10: Here Comes 310

- Top ten changes in Rev. 10:
  1. Addition of HVAC Grading pathway
  2. Revised HVAC design temperature limits
  3. Alignment of duct leakage test exemptions with RESNET standards
  4. Clarification of overlap between ENERGY STAR and code
  5. Guidance on conditioned floor area and window area
  6. Minor formatting and editorial changes
  7. Partnership status documentation
  8. Rater companies signing partnership agreement
  9. Clarifying infiltration verification for "total UA" option
  10. Clarification on mismatched HVAC equipment
Any questions?
ENERGY STAR Certified Homes

Web:
Home: www.energystar.gov/newhomespartners
Technical: www.energystar.gov/newhomesrequirements
MESA: www.energystar.gov/mesa

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