# ENERGY STAR<sup>®</sup> Residential New Construction Programs

# **Historical Document**

This document is provided for reference because it has been superseded by a more recent Version or Revision. Please find current program documents on the <u>Program</u> <u>Requirements</u> webpage.

Use of older Versions and Revisions, such as this document, are typically limited to homes and buildings with a permit date (or, for manufactured homes, a production date) prior to a specified date. Consult the <u>Implementation Timeline</u> table to assess whether a home or apartment is still eligible to be certified using this document.

For questions or more information, contact us at <u>energystarhome@energystar.gov</u>.



An ENERGY STAR Quality Assurance Checklist shall be completed during each quality assurance file review and field review (QA review) of homes being certified through the ENERGY STAR Single-Family New Homes program in accordance with the policies and procedures of the Home Certification Organization (HCO)<sup>1</sup>. This revision of the QA checklist is mandatory for homes certified under Version 3 / 3.1, Revision 11. QA reviews for homes certified under Revision 10 may continue to use the prior revision of this document titled "2020 Rater Quality Assurance Checklist." Review complete instructions on page 4.

## **ENERGY STAR Quality Assurance Checklist**

Home Address:         City:         State:	Zip Code:		
Action Items / Summary of QA	Yes	No	N/A
If any Items are marked "No" or "Not Verified," an action/explanation summary document shall be attached.			
Documentation Collection – Collect these items as part of the QA data file	Yes	No	N/A
A) Energy Rating File collected.			-
B) National Rater Design Review Checklist collected, with no Items left blank.			-
C) Documentation that builder had an ENERGY STAR partnership agreement at the time of certification. If			-
If Track A – HVAC Grading was pursued:			
D) HVAC design report compliant with ANSI / RESNET / ACCA Std. 310, with the ENERGY STAR supplement, collected, with no Items left blank.			
E) ANSI / RESNET / ACCA Std. 310 Rater Design Review Checklist collected, completed for applicable housing type and with all items marked "Rater Verified".			
If Track B – HVAC Credential was pursued:			
D) ENERGY STAR National HVAC Design Report collected, with no Items left blank.			
E) Documentation that HVAC contractor held required credential at the time of certification, unless all equipment is an exempted type, in which case check:  Exempted If documentation or active credential cannot be verified contact energy starboxes@energy star dov			
F) National Rater Field Checklist collected, with no Items left blank or marked Must Correct.			-
List of any exemptions or alternatives used by the Rater.			
Per 5b.1, written approval from designer collected if installed models do not match National HVAC Design Report.			
Per 7.7, if smaller distance is used for inlet and outlet of balanced ventilation system per footnote, manufacturer's instructions collected indicating that the smaller distance may be used.			
Rater name, rater inspection dates and rater initials are recorded.			-
If any Builder Verified Items are used, builder employee, builder inspection date and builder initials are recorded.			
<b>Energy Rating File</b> – File is consistent with program requirements, Rater's documentation, and field observations.	Yes	No	N/A
Energy Rating file passes the Home Certification Organization's (HCO's) quality assurance review checklist. <sup>1</sup>			-
ERI of the home meets or exceeds the ENERGY STAR ERI Target for the program version applicable at the time of certification.			-
Energy Rating file is consistent with the Rater Design Review Checklist			-
2.1 Modeled fenestration meets or exceeds 2009 IECC requirements.			-
3.1 Modeled ceiling, wall, floor, and slab insulation levels comply with one of the following options:			-
3.1.1 Meets or exceeds 2009 IECC levels <b>OR</b> ; <sup>2</sup>			-
3.1.2 Achieves ≤ 133% of the total UA resulting from the U-factors in the 2009 IECC Table 402.1.3 and modeled infiltration does not exceed: 3 ACH50 in CZs 1.2 2.5 ACH50 in CZs 3.4 2 ACH50 in CZs 5.6.7 1.5 ACH50 in CZ 8			-
Energy Rating file is consistent with the Rater Field Checklist			-
1.3 Modeled insulation achieves Grade Linstallation per ANSI / RESNET / ICC Std. 301. <sup>2</sup>			-
3.1, 3.3 & 4.10 Modeled attic insulation meets minimum R-value at perimeter, platforms and attic covers. <sup>2</sup>			_
3.2 For slabs on grade in CZ 4-8, slab edge modeled with $\geq$ R-5 insulation at depth specified by the 2009 IECC, <sup>2</sup>			
3.4 Modeled above grade walls are consistent with documented thermal bridging strategy (3.4.1. 3.4.2 or 3.4.3). <sup>2</sup>			-
6.3 Modeled supply and return ducts in unconditioned space are insulated to R-6. <sup>2</sup>			
6.4 & 6.5 Modeled duct leakage is consistent with Items 6.4 (total leakage) and 6.5 (leakage to outdoors).			
7.1 Modeled ventilation rate is within $\pm$ 15 CFM or $\pm$ 15% of design value (2.3).			-



National Rater Design Review Checklist				N/A	l.	
If Track A – HVAC Grading was pursued:						
4a.3 Cooling sizing % is within the cooling sizing limit selected by the HVAC designer.						
	If Track B – HVAC Credential was pursued:					
4b.2 ⊢	IVAC Design Report reviewed by Rater for the following parameters (National HVAC Design Report Item # indicat	ed in pa	renthesis	s):		
4b.2	2.1 Cooling season and heating season outdoor design temperatures used in loads (3.3) are within the limits defined at <u>energystar.gov/hvacdesigntemps</u> for the State and County where the home is built or the designer					
	has provided an allowance from EPA to use alternative values.					
4b.2	2.2 Number of occupants used in loads $(3.4)$ is within $\pm 2$ of the home being reviewed.					
4b.2	4b.2.3 Conditioned floor area used in loads (3.5) is between 100 sq. ft. smaller and 300 sq. ft. larger than the home being reviewed.					
4b.2	2.4 Window area used in loads (3.6) is between 15 sq. ft. smaller and 60 sq. ft. larger than the home being reviewed or, for homes with > 500 sq. ft. of window area, between 3% smaller and 12% larger.					
4b.2	4b.2.6 Sensible, latent & total heat gain are documented (3.10 – 3.12) for the orientation of the home being reviewed.					
4b.2	4b.2.7 The difference between the maximum total heat gain across orientations and that of the orientation of the home being reviewed (3.13) is ≤ 6 kBtuh. <sup>3</sup>					
4b.2	2.8 Cooling sizing % (4.13) is within the cooling sizing limit (4.15) selected by the HVAC designer.					
National Rater Field Checklist – Mandatory during Field Review; optional during File Review				Not Verified	N/A	
1. Hig	h-Performance Fenestration & Insulation					
1.2 Ac 3.	1.2 Accessible insulation (ceiling, wall, floor, and slab) complies with one of the following options, as specified in Item 3.1 of the National Rater Design Review checklist: <sup>2</sup>				-	
3.1.	1 Meets or exceeds 2009 IECC levels OR;					
3.1.	2 Meets or exceeds the modeled levels AND home infiltration does not exceed the following:		_		_	
	3 ACH50 in CZs 1,2 2.5 ACH50 in CZs 3,4 2 ACH50 in CZs 5,6,7 1.5 ACH50 in CZ 8					
1.3 Al	II insulation achieves Grade I install. per ANSI / RESNET / ICC Std. 301. <sup>2</sup>				-	
2. Full	y-Aligned Air Barriers					
2.3 At su	attic knee walls and skylight shaft walls, a complete air barrier provided that is fully aligned at exterior vertical Irface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in CZ 4-8.					
3. Red	luced 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.						
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8.						
4. Air	Sealing					
4.1 Vis	sible ducts, flues, shafts, plumbing, piping, wiring, exhaust fans & other penetrations to unconditioned space aled, with blocking / flashing as needed.				-	
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed. <sup>2</sup>						
4.9 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with weatherstripping or equivalent gasket.						
4.10 Attic access panels, drop-down stairs, & whole-house fans equipped with durable ≥ R-10 cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated.						
5. Hea	ting & Cooling Equipment - Complete Track A - HVAC Grading or Track B - HVAC Credential					
	5a.1 Blower fan volumetric airflow is Grade I or II per ANSI / RESNET / ACCA Std. 310.					
Track A	5a.2 Blower fan watt draw is Grade I or II per ANSI / RESNET / ACCA Std. 310.					
	5a.3 Refrigerant charge is Grade I per ANSI / RESNET / ACCA Std. 310. <sup>2</sup>					
Track	5b.1 In accordance with the checkbox selected by the Rater, HVAC manufacturer & model number of installed equipment matches either of the following (check box): <sup>2,3</sup>					
В	□ National HVAC Design Report □ Written approval from designer.					



**Final Inspection:** 

Rater Name:

# ENERGY STAR Single-Family New Homes Quality Assurance & Certification Review Checklists, Version 3 / 3.1 (Rev. 11)

6. Duct Quality Installation				No	Not Verified	N/A
6.1 Ductwork installed without kinks, sharp bends, compression or excessive coiled flexible ductwork.						
6.2 Bedrooms pressure-balanced using any combination of transfer grills, jump ducts, dedicated return ducts, and / or undercut doors to achieve measured pressure differential ≥ -3 Pa and ≤ +3 Pa with respect to main body of the house when all bedroom doors are closed & all air handlers are operating. For bedrooms with a design airflow ≥ 150 CFM as reported in item 5.5 of the HVAC Design Report, measured pressure differential ≥ -5 Pa ≤ 5 Pa.						-
6.3 All supply and re	eturn ducts in unconditioned space, inclu	ding connections to trunk ducts, are insulated to $\ge$ R-6.				
6.4 Measured total system with three	duct leakage meets the greater of $\leq$ 8 CF se or more returns, $\leq$ 12 CFM25 per 100	M25 per 100 sq. ft. of CFA or $\leq$ 80 CFM; or, for a duct sq. ft. of CFA or $\leq$ 120 CFM. <sup>2</sup>				
6.5 Measured duct	leakage to outdoors is the greater of $\leq 4$	CFM25 per 100 sq. ft. of CFA or $\leq$ 40 CFM25. <sup>2</sup>				
7. Dwelling Unit M	lechanical Ventilation Systems & In	lets In Return Duct				
7.1 Measured ventil	ation rate is within $\pm$ 15 CFM or $\pm$ 15% o	f design report value.				-
7.2 A readily-accessible 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).						-
7.3 For any outdoor	air inlet connected to a ducted return of	the HVAC system (Complete if present; otherwise check "N/	A"): <sup>2</sup>			
7.3.1 Controls au	utomatically restrict airflow using a motor	ized damper during vent. off-cycle and occupant override. <sup>2</sup>				
7.3.2 Rater-mea	sured vent. rate is ≤ 15 CFM or 15% abo	ve design value at highest HVAC fan speed. <sup>2</sup>				
7.7 Air inlet location	(Complete if ventilation air inlet location	was specified on design report; otherwise check "N/A"): <sup>3</sup>	-	-	-	
7.7.1 Inlet pulls ventilation air directly from outdoors & not from attic, crawlspace, garage, or adjacent dwelling unit.						-
7.7.2 Inlet is ≥ 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.						-
7.7.3 Inlet is provided with rodent / insect screen with $\leq 0.5$ inch mesh.						-
8. Local Mechanie	cal Exhaust					
In each kitchen & b	athroom, system is installed that exhaus	ts directly to outdoors & meets one of the following measured	d airflow	standar	ds:	
Location	Continuous Rate	Intermittent Rate				
8.1 Kitchen	$\geq$ 5 ACH, based on kitchen volume. <sup>2</sup>	≥ 100 CFM and, if not integrated with range, also ≥ 5 ACH based on kitchen volume $^{2}$				-
8.2 Bathroom	≥ 20 CFM	≥ 50 CFM				-
9. Filtration						
9.1 Filter location capable of accepting a MERV 6 filter installed in each ducted mechanical system in a location that facilitates access and regular service by the occupant. <sup>2,3</sup>						
9.2 Filter access panel includes gasket or comparable sealing mechanism and fits snugly against the exposed edge of filter when closed to prevent bypass.						
9.3 All return air and mechanically supplied outdoor air passes through filter location prior to conditioning. <sup>3</sup>						
10. Combustion A	Appliances					
10.1 Furnaces, boilers, and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented. <sup>2</sup>						
10.2 Fireplaces loca	ated within the home's pressure boundar	y are mechanically drafted or direct-vented. <sup>2</sup>				
10.3 If unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary, the Rater has followed ANSI / ACCA 12 QH-2014, Section 3.2.2, Appendix A Sections A2.2.6, A3, and A4, and verified the equipment meets the limits defined within.						
QA Review    Review Type:    File    Field    QA Reviewer:    Date of Review:						
Field Review: Rater Name: Status of home: DPre-drywall Final construction or completed			pleted			
Original Rating Rater Company Name:						
Pre-Drywall Inspection: Rater Name: Rater ID #:			_ Date	:		

Rater ID #: \_

Date: \_



#### Instructions for Performing Quality Assurance Review

- During File Review, complete the Action Items / Summary of QA, Documentation Collection, Energy Rating File and National Rater Design Review Checklist sections. During Field Review, complete the entire checklist.
- In accordance with the HCO's policies, a limited amount of the required QA Field Reviews may be performed at the pre-drywall stage. Mark items that are not yet installed as "N/A." 1
- Where a checklist item cannot be verified because it is not visible, not accessible, cannot be tested, or there are other extenuating circumstances, mark the box in the column "Not Verified," and include an explanation in an attached document.
- Additional items may be reviewed at the reviewer's discretion and included in the Additional Checklist Items and Exemptions report below.
- Items found to be out of compliance shall be corrected. If correction is not possible, the home's certification is required to be withdrawn (please contact <u>energystarhomes@energystar.gov</u> for guidance).

#### **Footnotes**

- 1. Home Certification Organizations (HCOs) are independent organizations recognized by EPA to implement an ENERGY STAR certification program for single-family and multifamily homes and apartments using an Energy Rating Index (ERI) compliance path. Learn more and find a current list of HCOs at <u>energystar.gov/partner\_resources/residential\_new/working/other\_participants/hco</u>.
- 2. This item has been edited for space or has a footnote with an exemption or alternative. Refer to referenced program document for details. When an item is properly met using an exemption or alternative, mark the item as "Yes" and record a description in the Additional Checklist Items and Exemptions table.
- 3. This requirement is modified from the original program requirement in order to be applicable in the context of a finished home.

### **Additional Checklist Items and Exemptions**

Use this space to list additional Items reviewed and describe any exemptions or alternatives that were used (attach additional pages, if needed) Not **Checklist Name** Item # Notes Yes No N/A Verified Π П П Π Π П П 



## **Certification Review**

EPA has developed a process, called Certification Review, to address cases where a homeowner has concerns about the ENERGY STAR certification of their home. The purpose of a Certification Review is to determine whether a home should maintain its ENERGY STAR certification. There are two possible outcomes: (1) the home will maintain its ENERGY STAR certification or (2) the home's ENERGY STAR certification will be withdrawn. Learn more at <u>energystar.gov/partner\_resources/residential\_new/certification\_review</u>.

#### **Certification Review Process**

When a Home Certification Organization (HCO)<sup>1</sup> receives an eligible homeowner inquiry, the HCO will initiate a Certification Review of the home and assign it to an appropriate individual according to the HCO's policies. The assigned reviewer shall complete the Certification Review within 60 days by performing the following steps.

- 1. **Collect Documentation.** Collect all pertinent documentation using the Document Collection sections of the Quality Assurance Checklist and Certification Review Supplement Checklist. Inability to collect a required documentation item constitutes a failure, in which case proceed directly to Step 3: preparing the certification review report.
- 2. Perform Home Inspection. Coordinate a time with the homeowner to inspect the home. During that inspection, complete the remainder of the Quality Assurance Checklist and Certification Review Supplement Checklist based on observations of the current state of the home.
- 3. Prepare Certification Review Report. Prepare a report that includes the completed Quality Assurance Checklist and Certification Review Supplement Checklist, documented observations of the home's current state, and a determination of whether the Certification Review passes or fails. Share a copy of the report with the HCO, which will in turn provide a copy to the homeowner.

If the assigned reviewer determines that the Certification Review fails, the ENERGY STAR certification of the home shall be withdrawn.

If the assigned reviewer determines that the Certification Review passes, the ENERGY STAR certification of the home shall be maintained. In that case, the homeowner has the opportunity to appeal the determination. Refer to the HCO's policies for details on the appeals process.

#### Instructions for Performing Certification Review

This document should be used in conjunction with the applicable ENERGY STAR Certified Homes Program Requirements, Rater Design Review Checklist, Rater Field Checklist, HVAC Design Report, HVAC Commissioning Checklist, and Water Management System Builder Requirements. Additional program requirements may be inspected and included in the Additional Checklist Items and Exemptions table above. Alternatives and exceptions in those documents, including those in the footnotes, should be considered where applicable. Where a program revision or policy record entry has lowered the stringency of a requirement, the most recent policy may be used, even if it was not in place at the time of original certification.

In general, the benefit of doubt should be given to the original rating unless it is definitively clear that a requirement was not met at time of certification. The assigned reviewer should apply judgment in accounting for normal aging of construction materials over time, such as the settling of blown insulation. For example, for item 4.9 of the National Rater Field Checklist, the focus should be on the *presence* of weatherstripping on doors rather than the current *efficacy* of the weatherstripping. The Certification Review Supplement Checklist modifies performance thresholds for certain checklist Items to account for these types of aging effects.

Homes are eligible for Certification Review only if there have been no significant structural changes to the home since it was built. If such modifications are observed, the assigned reviewer has the prerogative to suspend the inspection and share documentation of the observed modifications with the HCO in lieu of the Certification Review Report.

If any individual item on the Rater Quality Assurance Checklist or Certification Review Supplement Checklist is marked as "No", the Certification Review is considered to have failed.

#### **Guidance on Destructive Testing**

At the behest of the homeowner, destructive testing may be used to inspect items that would otherwise not be visible. For example, if it were suspected that no insulation was installed in an exterior wall, observation holes could be drilled in the interior gypsum board. The homeowner bears complete responsibility for arranging all demolition and repair for destructive testing that they elect to undertake. Before undertaking destructive testing, it is recommended that homeowners consult with a qualified expert who can use non-invasive methods like infrared imaging to prioritize areas of concern. Demolition work, such as drilling observation holes, must occur in the presence of the assigned reviewer performing the Certification Review. Areas that are exposed outside the presence of the assigned reviewer of the Certification Review.



### **Certification Review Supplement Checklist**

Documentation	Collection		Yes	No	N//	A	
If Path B – HVAC Credential was pursued, HVAC Commissioning Checklist collected, with no Items left blank							
Energy Rating File – File is consistent with program requirements, rater's documentation, and field observations.					1		
Energy Rating file passes the Home Certification Organization's (HCO's) Certification Review checklist. <sup>1</sup>				-			
Rater Field Che	ecklist		Yes	No	Not Verified	N/A	
1.2 If item 3.1 of the Rater Design Review Checklist was met using item 3.1.2, infiltration is permitted to meet the				_			
4 ACH	150 in CZs 1,2 3.5 ACH50 in CZs	3,4 3 ACH50 in CZs 5,6,7 2.5 ACH50 in CZ 8					
6. Duct Quality Ir	stallation					<u> </u>	
6.2 Measured pressure differential meets $\leq$ 5 Pa or, for bedrooms with a design airflow $\geq$ 150 CFM, $\leq$ 8 Pa. <sup>3</sup>						-	
6.4 Measured total duct leakage is permitted to meet ≤ 12 CFM25 per 100 sq. ft. of CFA or ≤ 120 CFM or, for a duct system with three or more returns, ≤ 16 CFM25 per 100 sq. ft. of CFA or ≤ 180 CFM. <sup>3</sup>							
6.5 Measured duct	leakage to outdoors is permitted to meet	$s \le 6$ CFM25 per 100 sq. ft. of CFA or $\le 60$ CFM25. <sup>3</sup>					
7. Whole-House	Mechanical Ventilation System						
7.1 Measured vent	7.1 Measured ventilation rate is permitted to be within $\pm$ 25 CFM or $\pm$ 25% of design value (2.3). <sup>3</sup>					-	
7.3 If outdoor intakes are connected to return side of the HVAC system, controls must be installed which are capable of operating intermittently & automatically based on a timer and restricting intake when not in use. As long as the controls are <i>capable</i> of meeting these criteria, it is permissible for the control's <i>settings</i> to differ at the time of certification review. <sup>2, 3</sup>						-	
8. Local Mechani	ical Exhaust						
Kitchen & bathroor	n exhausts systems are permitted to mee	et one of the following measured airflow standards: <sup>3</sup>					
Location	Continuous Rate	Intermittent Rate			_		
8.1 Kitchen	≥ 3 ACH, based on kitchen volume <sup>2</sup>	$\ge$ 60 CFM and, if not integrated with range, also $\ge$ 3 ACH based on kitchen volume <sup>2</sup>				-	
8.2 Bathroom	≥ 12 CFM	≥ 30 CFM				-	
Water Management System Builder Requirements			Yes	No	Not Verified	N/A	
1. Water-Manage	d Site and Foundation						
1.1 Patio slabs, porch slabs, walks, and driveways sloped ≥ 0.25 in. per ft. away from home to edge of surface or 10 ft., whichever is less.							
1.2 Final grade sloped $\ge$ 0.25 in. per ft. away from home for $\ge$ 10 ft. <sup>2, 3</sup>					-		
1.7 Sump pump covers mechanically attached with full gasket seal or equivalent.							
2. Water-Manage	d Wall Assembly						
2.1 Flashing at bottom of exterior walls with weep holes included for masonry veneer, or equivalent drainage system. See footnote on the Water Management System Builder Requirements for exemptions. <sup>2</sup>							
3. Water-Manage	d Roof Assembly						
3.2 For homes 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. <sup>2</sup>							
4. Water-Manage	d Building Materials				1	1	
4.1 Wall-to-wall carpet not installed within 2.5 ft. of toilets, tubs, and showers.						-	
4.6 For each condensate-producing HVAC component, corrosion-resistant drain pan (e.g., galvanized steel, plastic) included that drains to a conspicuous point of disposal in case of blockage. <sup>2</sup>							

#### **Footnotes**

- 1. Home Certification Organizations (HCOs) are independent organizations recognized by EPA to implement an ENERGY STAR certification program for single-family and multifamily homes and apartments using an Energy Rating Index (ERI) compliance path. Learn more and find a current list of HCOs at <u>energystar.gov/partner\_resources/residential\_new/working/other\_participants/hco</u>.
- 2. Where the checklist item cannot be verified because it is not visible, not accessible, cannot be tested, or there are other extenuating circumstances, mark the box in the column "Not Verified," and include an explanation in an attached document.
- 3. This item has been edited for space or has a footnote with an exemption or alternative. Refer to referenced program document for full details. When an item is properly met using an exemption or alternative, mark the item as "Yes" and record a description in the Additional Checklist Items and Exemptions table.
- 4. This requirement is modified from the original program requirement in order to be applicable in the context of a finished home.