

# 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### Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision.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 [Program Requirements](#) 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 [Implementation Timeline](#) 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 [energystarhome@energystar.gov](mailto:energystarhome@energystar.gov).



# ENERGY STAR Multifamily New Construction

## Quality Assurance Checklist (MRO), v1 / 1.1 / OR-WA 1.2 (Rev. 02)

An ENERGY STAR Quality Assurance Checklist shall be completed during each quality assurance field review (QA review) of buildings being certified through the ENERGY STAR Multifamily New Construction program's Prescriptive and ASHRAE paths in accordance with the policies and procedures of the Multifamily Review Organization (MRO). This revision of the QA checklist is mandatory for buildings certified under Version 1 / 1.1 / OR-WA 1.2, Revision 02. QA reviews for buildings certified under Revision 01 may continue to use the prior revision of this document titled "2020 Rater Quality Assurance Checklist - MRO", available upon request by email at [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov). Review [complete instructions](#) on page 6 below.

### ENERGY STAR Quality Assurance Checklist

Project Name: _____		Number of Units: _____		Permit Date: _____		
Building Address: _____		City: _____		State: _____		
<b>QA Review</b>	Review Type: <input type="checkbox"/> Field	QA Reviewer: _____	Date of Review: _____			
	Unit Number: _____	Common Spaces: _____				
	Rater Being QA'd: _____	Status of Project: <input type="checkbox"/> Pre-drywall <input type="checkbox"/> Final construction or completed				
<b>Original Rating</b>	Rater Company Name: _____		<input type="checkbox"/> Confirmed as ENERGY STAR Partner			
<b>Pre-Drywall Inspection:</b>	Rater Name: _____	Rater ID #: _____	Date: _____	<input type="checkbox"/> MFNC Training Complete		
<b>Final Inspection:</b>	Rater Name: _____	Rater ID #: _____	Date: _____	<input type="checkbox"/> MFNC Training Complete		
<b>Action Items / Summary of QA</b>				<b>Yes</b>	<b>No</b>	<b>N/A</b>
If any Item marked "No" or "Not Verified," an action/explanation summary document shall be attached				<input type="checkbox"/>	-	<input type="checkbox"/>
<b>Documentation Collection</b> – Collect these items as part of the QA data file				<b>Yes</b>	<b>No</b>	<b>N/A</b>
A) ASHRAE Path: ASHRAE Path Calculator collected and energy modeling files or input/output reports.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B) ASHRAE Path: Documentation collected that ASHRAE modeler was listed in the online directory at the time of certification.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C) National Rater Design Review Checklist collected, with no Items left blank.				<input type="checkbox"/>	<input type="checkbox"/>	-
D) Documentation collected that builder or developer had an ENERGY STAR partnership agreement at the time of certification. If documentation of active partnership cannot be verified, contact <a href="mailto:energystarhomes@energystar.gov">energystarhomes@energystar.gov</a> .				<input type="checkbox"/>	<input type="checkbox"/>	-
<b>If Track A – HVAC Grading by Rater was pursued:</b>						
E.a) HVAC design report compliant with ANSI / RESNET / ACCA Std. 310, with the ENERGY STAR MFNC supplement, collected, with no Items left blank.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F.a) ANSI / RESNET / ACCA Std. 310 Rater Design Review Checklist collected, completed for applicable housing type and with all items marked "Rater Verified".				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If Track B – HVAC Testing by FT Agent was pursued:</b>						
E.b) ENERGY STAR National HVAC Design Report collected, with no Items left blank.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G) National Rater Field Checklist collected, with no Items left blank or marked Must Correct.				<input type="checkbox"/>	<input type="checkbox"/>	-
List of any exemptions or alternatives used by the Rater.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Per 1.2, 3.5, and/or 3.6, documentation collected on alternative UA calculations, if used for compliance.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Per 5b.1, written approval from designer collected, if installed models do not match Design Report.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Per 7.3 and 8.3, documentation collected of the measured ventilation airflows in common spaces.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Per 12.2 and 12.3, and/or 12.7, lighting power density calculations collected. <sup>1</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Per 14.1, for buildings 50,000 ft and larger, documentation collected confirming the strategy used to enable the collection of monthly or annual building-level energy consumption data. <sup>1</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name, Inspection Dates are recorded.				<input type="checkbox"/>	<input type="checkbox"/>	-
If any Builder Verified Items are used, Builder Employee, Builder Inspection Date and Builder Initials are recorded.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If any LP Verified Items are used, Licensed Professional, LP Inspection Date and LP Initials are recorded.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H) National HVAC Functional Testing Checklist(s) collected for common space systems and Dwelling Unit systems using Track B – HVAC Testing by FT Agent, with no Items left blank and with all HVAC systems in the building / project fully documented. Exception: Where credentialed HVAC Contractor(s) are completing the National HVAC Functional Testing Checklist, the checklist is not required to be collected. <sup>1</sup>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I) Documentation collected that Functional Testing Agent(s) held credential required to complete the National HVAC Functional Testing Checklist(s) and were listed on the appropriate online directory at the time of certification.				<input type="checkbox"/>	<input type="checkbox"/>	-



# ENERGY STAR Multifamily New Construction

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<b>Energy Modeling File</b> – File is consistent with program requirements, Rater’s documentation, and field observations.	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Energy Modeling file passes the MRO’s quality assurance review checklist. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
Performance meets or exceeds the ENERGY STAR Performance Target based on the commercial code in effect when the building was permitted.	<input type="checkbox"/>	<input type="checkbox"/>	-
Energy Modeling file is consistent with the National Rater Design Review Checklist	<input type="checkbox"/>	<input type="checkbox"/>	-
2.1.2 & 2.2.2 Modeled fenestration meets or exceeds 2009 IECC residential and commercial requirements, for dwelling units and common spaces, respectively. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
3.1.2 & 3.2.2 Modeled ceiling, wall, floor, and slab insulation levels meet or exceed values from the applicable column in the 2009 IECC Commercial chapter. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
Energy Modeling file is consistent with the National Rater Field Checklist	<input type="checkbox"/>	<input type="checkbox"/>	-
1.5 & 1.6 For heated plenums and garages, space heating is modeled as specified, and as limited by Item 5.10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1, 3.2 & 3.3 Modeled attic insulation meets minimum R-value at perimeter, platforms and attic covers. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
3.4 For slabs on grade in CZ 4-8, slab edge modeled with ≥ R-5 insulation at depth specified by the 2009 IECC. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5 & 3.6 Modeled elevated concrete slabs are consistent with UA requirements or alternatives. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7 Modeled above grade walls are consistent with documented thermal bridging strategy (3.7.1, 3.7.2 or 3.7.3). <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
7.2 Modeled ventilation rate is within ± 15 CFM or ± 15% of dwelling unit design values (2.7), and meets or exceeds rates required by ASHRAE 62.2-2010. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
7.3 Modeled ventilation rate is within ± 15 CFM or ± 15% of common space design values (2.9), and meets or exceeds rates required by ASHRAE 62.1-2010. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	-
<b>National Rater Design Review Checklist</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
2.2.1 Rater documentation that installed common space fenestration meets or exceeds ENERGY STAR MF Reference Design Req’ts. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.1 Rater documentation that installed common space ceiling, wall, floor, and slab-on-grade insulation levels meet or exceed ENERGY STAR MF Reference Design requirements. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If Track A – HVAC Grading by Rater was pursued:</b>			
4a.3 Prescriptive Path: Dwelling Unit Mechanical Ventilation is <150% of ASHRAE 62.2-2013 requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4a.4 Total occupant gains do not exceed 645 Btuh per occupant. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4a.5 Non-occupant internal gains are less than 3,600 Btuh.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4a.6 Cooling sizing % is within the cooling sizing limit selected by HVAC designer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>If Track B – HVAC Testing by FT Agent was pursued:</b>			
4b.2 National HVAC Design Report(s) reviewed for the following parameters (National MFNC HVAC Design Report Item # indicated in parenthesis):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.1 Prescriptive Path: Dwelling Unit Mechanical Ventilation is <150% of ASHRAE 62.2-2013 requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.2 Cooling season and heating season outdoor design temperatures used in loads (3.4) are within the limits defined for the State and County where the building will be built, or the designer has provided an allowance from EPA to use alternative values. All limits are published at <a href="http://www.energystar.gov/hvacdesigntemps">www.energystar.gov/hvacdesigntemps</a> . Note that revised (i.e., 2019 Edition) limits are required to be used for all HVAC Design Reports generated after 07/01/2020. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.3 Number of occupants used in loads (3.6) is within ± 2 of the dwelling unit being reviewed and total occupant gains (3.7) do not exceed 645 Btuh per occupant. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.4 Conditioned floor area used in loads (3.8) is between 100 sq. ft. smaller and 300 sq. ft. larger than the dwelling unit being reviewed. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.5 Window area used in loads (3.9) is between 15 sq. ft. smaller and 60 sq. ft. larger than the dwelling unit being reviewed, or for dwelling units to be certified with > 500 sq. ft. of window area, between 3% smaller and 12% larger. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.6 Predominant window SHGC used in loads (3.10) is within 0.1 of rater-documented predominant value installed in the dwelling unit being reviewed. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.7 Mechanical ventilation used in loads (3.12) is the same as the ventilation design (2.7) for the given unit plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.8 Non-occupant internal gains (3.13) are less than 3,600 Btuh.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.9 Sensible & total heat gain are documented (3.15, 3.17) for the orientation of the dwelling unit being reviewed. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4b.2.10 Cooling sizing % (4.18) is within the cooling sizing limit (4.19) selected by the HVAC designer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ENERGY STAR Multifamily New Construction

## Quality Assurance Checklist (MRO), v1 / 1.1 / OR-WA 1.2 (Rev. 02)

National Rater Field Checklist	Yes	No	Not Verified	N/A
<b>1. High-Performance Fenestration &amp; Insulation</b>				
1.2 Accessible insulation in dwelling units meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist. Where no examples are accessible, rater documentation of installed insulation is reviewed.				
3.1.1 Prescriptive Path: Installed ceiling and floor insulation levels meet or exceed ENERGY STAR MF Reference Design requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.1.2 ASHRAE Path: Installed ceiling and floor insulation levels meet or exceed values from the "Group R" column in the 2009 IECC Commercial chapter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 Accessible insulation in common spaces meets or exceeds levels specified in Item 3.2 of the Rater Design Review Checklist. Where no examples are accessible, rater documentation of installed insulation is reviewed. <sup>3</sup>				
3.2.1 Prescriptive Path: Installed ceiling and floor insulation levels meet or exceed ENERGY STAR MF Reference Design requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2.2 ASHRAE Path: Installed ceiling and floor insulation levels meet or exceed values from the "All Other" column in the 2009 IECC Commercial chapter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Prescriptive Path: Window-to-wall ratio ≤ 30%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 All visible insulation achieves Grade I install. per ANSI / RESNET / ICC Std. 301. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Heated plenums in unconditioned space or ambient conditions meet the following requirements: <sup>1</sup>				
1.5.1 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, AND;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5.2 Insulation at top of plenum meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC, AND;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5.3 Bottom of heated plenum has at least R-13 insulation. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6 Prescriptive Path: Garages with space heating meet the following requirements: <sup>1</sup>				
1.6.1 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, AND;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6.2 Ceiling insulation meets or exceeds the R-value for mass floors from the "All Other" column of Table 502.2(1) of 2009 IECC.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. Reduced Thermal Bridging</b>				
The following items must be verified in the dwelling unit being reviewed and 50% of common spaces where the condition is present:				
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. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3 Insulation beneath attic platforms (e.g., HVAC platforms, walkways) ≥ R-21 in CZ 1-5; ≥ R-30 in CZ 6-8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. Air Sealing</b>				
The following items must be verified in the dwelling unit being reviewed and 50% of common spaces where the condition is present, to reduce air leakage to exterior, adjacent buildings, or unconditioned spaces:				
4.1 Visible ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2 Recessed lighting fixtures adjacent to unconditioned space ICAT labeled and gasketed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.7 Doors adjacent to unconditioned space (e.g., attics, garages, basements) or ambient conditions made substantially air-tight with doorsweep and weatherstripping or equivalent gasket.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8 Attic access panels, roof hatches and drop-down stairs are gasketed (i.e., not caulked) or equipped with durable covers that are gasketed. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The following items must be additionally verified in the dwelling unit being reviewed:				
4.9 Doors serving as a unit entrance from a corridor/stairwell made substantially air-tight with doorsweep and weatherstripping or equivalent gasket.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10 Measured compartmentalization is no greater than 0.30 CFM50 per square feet of dwelling unit enclosure area, following procedures in ANSI / RESNET / ICC Std. 380. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10.1 For dwelling units with forced air distribution systems without ducted returns and located in a closet adjacent to unconditioned space, the measured pressure difference between the space containing the air handler and the conditioned space during the compartmentalization test is no greater than 5 Pa. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ENERGY STAR Multifamily New Construction

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5. Heating & Cooling Equipment – Complete Track A – HVAC Grading or Track B – HVAC Testing by FT Agent		Yes	No	Not Verified	N/A
Track A	5a.1 Blower fan volumetric airflow is Grade I or II per ANSI / RESNET / ACCA Std. 310.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5a.2 Blower fan watt draw is Grade I or II per ANSI / RESNET / ACCA Std. 310.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5a.3 Refrigerant charge is Grade I per ANSI / RESNET / ACCA Std. 310. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Track B	5b.1 HVAC manufacturer & model number on installed equipment matches either of the following (check box): <sup>1</sup> <input type="checkbox"/> National HVAC Design Report (4.6-4.9 & 4.25-4.26) <input type="checkbox"/> Written approval received from designer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
5.4 Prescriptive Path: Heating and cooling equipment serving dwelling units and common spaces meet the efficiency levels specified in the Exhibit X. Electric resistance space heating is not installed in dwelling units.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment Controls					
5.8 All heating and cooling systems serving the dwelling unit have thermostatic controls within the dwelling unit which are not located on exterior walls.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.8.1 Prescriptive Path: Dwelling unit thermostats are programmable.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.9 Stair and elevator shaft vents 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.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.10 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 when pipe wall or garage / plenum temperatures are above 40°F.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.10.1 Where heat tracing is installed for freeze-protection, controls must be based on pipe wall temperature and a minimum of R-3 pipe insulation is also required.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.11 Snow- and ice-melting systems include automatic controls that are verified to shut off the systems when the pavement temperature is above 50°F and no precipitation is falling, and an automatic or manual control is installed that is verified to shut off system when the outdoor temperature is above 40°F, so that the potential for snow or ice accumulation is negligible.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydronic Distribution					
5.12 For hydronic distribution systems, all terminal heating and cooling distribution equipment are separated from the riser or distribution loop by a control valve or terminal distribution pump, so that heated or cooled fluid is not delivered to the dwelling unit distribution equipment when there is no call from the thermostat.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.13 In the dwelling unit being reviewed, terminal units in hydronic distribution systems are equipped with pressure independent balancing valves or pressure independent control valves.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.15 For circulating pumps serving hydronic htg. or clg. systems with 3-phase motors, 1 HP or larger, motors meet or exceed efficiency standards for NEMA Premium™ motors. If 5 HP or larger, also installed with VFDs. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Duct Quality Installation					
6.1 In the dwelling unit being reviewed, ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2 Bedrooms with a design supply airflow ≥ 150 CFM (per Item 5.2 on the National HVAC Design Report) pressure-balanced (e.g., using transfer grilles, jump ducts, dedicated return ducts, undercut doors) to achieve a measured pressure differential ≥ -5 Pa and ≤ +5 Pa with respect to the main body of the dwelling unit when all air handlers are operating. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3 In the dwelling unit being reviewed, all visible supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to ≥ R-6. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3.1 Prescriptive Path: Dwelling unit ductwork meets the location and insulation requirements specified in the ENERGY STAR Multifamily Reference Design.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4 Measured total duct leakage in dwelling unit being reviewed meets one of the following two options: <sup>1</sup>					
6.4.1 <u>Rough-in</u> : Tested per allowances below, with the air handler & all ducts, building cavities used as ducts, & duct boots installed. In addition, verified <u>all</u> duct boots sealed to finished surface, at final. <sup>1</sup> <u>No ducted returns</u> : <sup>1</sup> The greater of ≤ 3 CFM25 per 100 sq. ft. of CFA or ≤ 30 CFM. Additionally, the measured pressure difference between the space containing the air handler and the conditioned space, with the air handler running at high speed, is ≤ 5 Pa. For systems > 1 ton, increase by 1 Pa per half ton. <u>One or two ducted returns</u> : <sup>1</sup> The greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM. <u>Three or more ducted returns</u> : <sup>1</sup> The greater of ≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.4.2 <u>Final</u> : Tested per allowances below, with the air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed. <sup>1</sup> <u>No ducted returns</u> : <sup>1</sup> The greater of ≤ 6 CFM25 per 100 sq. ft. of CFA or ≤ 60 CFM. Additionally, the measured pressure difference between the space containing the air handler and the conditioned space, with the air handler running at high speed is ≤ 5 Pa. For systems > 1 ton, increase by 1 Pa per half ton. <u>One or two ducted returns</u> : <sup>1</sup> The greater of ≤ 8 CFM25 per 100 sq. ft. of CFA or ≤ 80 CFM. <u>Three or more ducted returns</u> : <sup>1</sup> The greater of ≤ 12 CFM25 per 100 sq. ft. of CFA or ≤ 120 CFM.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.5 Townhouses only: Measured duct leakage to the outside the greater of ≤ 4 CFM25 per 100 sq. ft. of CFA or ≤ 40 CFM25. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# ENERGY STAR Multifamily New Construction

## Quality Assurance Checklist (MRO), v1 / 1.1 / OR-WA 1.2 (Rev. 02)

6.7 Duct leakage of central exhaust system that serves four or more dwelling units, serving the dwelling unit being reviewed meets one of the following two options:					
6.7.1 <u>Rough-in</u> : Tested including horizontal run outs, trunks, branches, and take-offs up to, but not including, the grilles where the leakage does not exceed 25% of exhaust fan flow. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.7.2 <u>Final</u> : Tested inclusive of all ductwork between the fan and the grilles where the leakage does not exceed 30% of exhaust fan flow. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7. Dwelling-Unit &amp; Common Space Mechanical Ventilation Systems &amp; Inlets in Return Duct</b>					
7.1 Ventilation manufacturer & model number on installed equipment in the building matches either of the following (check box): <sup>1,4</sup> <input type="checkbox"/> National HVAC Design Report <input type="checkbox"/> Written approval received from designer		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.2 Measured ventilation rate is within either $\pm 15$ CFM or $\pm 15\%$ of dwelling unit design values (2.7), and meets or exceeds rates required by ASHRAE 62.2-2010. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.3 Measured ventilation rate is within either $\pm 15$ CFM or $\pm 15\%$ of common space design values (2.9), and meets or exceeds rates required by ASHRAE 62.1-2010. <sup>1,5</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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). Townhouses only: 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).		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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"): <sup>1</sup>		-	-	-	<input type="checkbox"/>
7.5.1 Controls automatically restrict airflow using a motorized damper during vent, off-cycle and occupant override. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.5.2 Measured vent. Rate is $\leq 15$ CFM or 15% above design value at highest HVAC fan speed. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.9 If central exhaust fans, $\leq 1$ HP, are installed as part of the dwelling-unit mechanical ventilation system, the lesser of 5 or 20% of the installed fans are verified as direct-drive, ECM, with variable speed controllers. If $> 1$ HP, the lesser of 5 or 20% of the fans are installed with NEMATM Premium Motors.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.10 Air inlet locations (Complete if air inlet locations were installed (2.22, 2.23); otherwise check "N/A"): <sup>1</sup>		-	-	-	<input type="checkbox"/>
7.10.1 Inlet(s) pull ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
7.10.2 Inlet(s) are $\geq 2$ ft. above grade or roof deck; $\geq 10$ ft. of stretched-string distance from known contamination sources not exiting the roof, and $\geq 3$ ft. distance from dryer exhausts and sources exiting the roof. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
7.10.3 Inlet(s) are provided with rodent / insect screen with $\leq 0.5$ inch mesh.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
<b>8. Local Mechanical Exhaust</b> (National HVAC Design Report Item # indicated in parenthesis)					
<b>Dwelling Unit Mechanical Exhaust</b> – In each dwelling unit kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following measured airflow standards: <sup>1</sup>					
<b>Location</b>		<b>Continuous Rate</b>	<b>Intermittent Rate</b> <sup>1</sup>		
8.1 Kitchen	Airflow	$\geq 5$ ACH, based on kitchen volume <sup>1</sup>	$\geq 100$ CFM and, if not integrated with range, also $\geq 5$ ACH based on kitchen volume <sup>1</sup>		
8.2 Bathroom	Airflow	$\geq 20$ CFM	$\geq 50$ CFM		
<b>Mechanical Exhaust for Common Spaces and Shared Garages</b>					
8.3 Measured exhaust rates are $\geq$ ASHRAE 62.1 rates (2c). <sup>1,5</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.4 Where a garage exhaust ventilation system is installed, it is equipped with controls that sense CO and NO2.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>9. Filtration</b>					
9.1 In the dwelling unit being reviewed, MERV 6+ filter(s) installed in each ducted mechanical system, serving an individual dwelling unit and located to facilitate access & regular service by the occupant or building owner. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.1.1 Filter access panel includes gasket and fits snugly against the edge of filter when closed to prevent bypass. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.1.2 All return air and mechanically supplied outdoor air passes through filter prior to conditioning.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>10. Combustion Appliances</b>					
10.1 Furnaces, boilers, and water heaters located within the building's pressure boundary are mechanically drafted or direct-vented. If mechanically drafted, the minimum volume of combustion air required for safe operation by the manufacturer and/or code shall be met or exceeded and make-up air sources must be mechanically closed when the combustion appliance is not in operation. <sup>1,4</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.2 In the dwelling unit being reviewed and all applicable common spaces, fireplaces located within the building's pressure boundary are direct-vented. <sup>1</sup>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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10.3 In the dwelling unit being reviewed and all applicable common spaces, no unvented combustion appliances other than cooking ranges or ovens are located inside the building's pressure boundary. For cooking ranges and ovens, local mechanical exhaust per Rater Field Checklist Item 8.1 requirements must be met. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>11. Domestic Hot Water</b>				
11.1 Prescriptive Path: Hot water equipment rated in EF or UEF meet the efficiency levels specified in the ENERGY STAR Multifamily Reference Design. Otherwise, meet or exceed 85% Et.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.3 For in-unit storage water heaters, AHRI Certificate confirms the presence of a heat trap.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.4 Where visible in the dwelling unit, DHW piping is insulated with a minimum of R-3. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
11.5 Measured delivery temperatures at faucets and showerheads do not exceed 125°F. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
<b>12. Lighting</b>	<b>Yes</b>	<b>No</b>	<b>Not Verified</b>	<b>N/A</b>
<b>12.1 Common Space Lighting Controls:</b>				
12.1.1 Prescriptive Path: At least 50% of common spaces (including shared garages), except the building lobby and where automatic shutoff would endanger the safety of occupants, have occupancy sensors or automatic bi-level lighting controls installed and operation has been verified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.1.2 ASHRAE Path: All common spaces (including shared garages), except the building lobby, corridors, and stairwells and where automatic shutoff would endanger the safety of occupants, have occupancy sensors or automatic bi-level lighting controls installed and operation has been verified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>12.2 Common Space Lighting Power Density Maximum (except garages): <sup>1</sup></b>				
12.2.1 Prescriptive Path: Rater-provided lighting power density calculations for the combined common spaces do not exceed ASHRAE 90.1-2007 allowances for those combined spaces, using the Space-by-Space or Building Area Method. For at least 50% of common spaces, the fixture counts, wattage, and approximate square footage are confirmed. <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.2.2 ASHRAE Path: Total installed lighting power for the combined common spaces must not exceed ASHRAE 90.1-2007 allowances for those combined spaces, using the Space-by-Space or Building Area Method, by more than 20%.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.3 Shared garages: Rater-provided lighting power density calculations do not exceed 0.24 W/ft <sup>2</sup> . The fixture counts, fixture wattage, and approximate square footage are confirmed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.4 Exterior lighting controls: Fixtures, including parking lot fixtures, must include automatic switching on timers or photocell controls except fixtures intended for 24-hour operation, required for security, or located on dwelling unit balconies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.6 Prescriptive Path: All lighting fixtures (i.e., dwelling units, common spaces, and exterior) meet the efficiency requirements in the ENERGY STAR Multifamily Reference Design.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.7 Prescriptive Path: Dwelling unit overall in-unit lighting power density ≤ 0.75 W/ft <sup>2</sup> . When calculating overall lighting power density, use 1.1 W/ft <sup>2</sup> where lighting is not installed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>13. Appliances, Ceiling Fans, and Plumbing Fixtures</b>				
13.1 Prescriptive Path: Installed appliances are ENERGY STAR certified. Installed bathroom faucets, bathroom aerators, and showerheads are WaterSense labeled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.3 Prescriptive Path: Shower compartments with multiple fixtures cannot be operated simultaneously OR the total flow rate per shower compartment must not exceed 1.75 gallons per minute, as rated at 80 psi.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>14. Whole Building Energy Consumption Data Acquisition Strategy</b>				
14.1 For buildings 50,000 ft and larger, if the strategy involves a meter or other item installed at the location, this device has been confirmed as a strategy that enables the collection of monthly or annual building-level energy consumption data (electricity, natural gas, chilled water, steam, fuel oil, propane, etc.). <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Instructions for Performing Quality Assurance Review

- This checklist is used to document the quality assurance review of the items being verified by the Rater in the dwelling units and common spaces of an ENERGY STAR Multifamily New Construction building.
- One checklist shall be used to document all applicable items for one dwelling unit and the common space. Where more than one dwelling unit in a building is being reviewed, additional checklists shall be used for the additional dwelling units, but the common space only needs to be reviewed once per building.
- In accordance with the MRO'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." <sup>1</sup>
- 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 building's certification is required to be withdrawn (please contact [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov)).



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### Footnotes

1. 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.
2. This requirement is modified from the original program requirement in order to be applicable in the context of a finished building.
3. While the QA Reviewer is not required to verify compliance with the insulation requirements in each common space, the QA Reviewer is required to review the ceiling insulation in at least one common space and floor insulation in at least one common space, if applicable.
4. For Items 5b.1, 5.5, 7.1, and 10.1 while the QA Reviewer is not required to verify compliance for each HVAC and ventilation system installed in the building, the QA Reviewer shall verify compliance for the systems serving the dwelling unit being reviewed and in addition, the QA Reviewer shall verify compliance for a minimum of two systems that provide heating and/or cooling to a common space, and two systems that provide ventilation to a common space.
5. For Items 7.3 and 8.3, while the QA Reviewer is not required to verify compliance with the ventilation requirements in each common space, the QA Reviewer is required to review the Rater-provided common space ventilation test results for compliance. The QA Reviewer is then required to directly measure ventilation airflows for the lesser of 5 or 20% of the reported values.





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## Additional Checklist Items and Exemptions

**Additional Checklist Items** - Use this space to list additional items reviewed (attach additional pages, if needed)

Checklist/Section Name	Item #	Notes	Yes	No	Not Verified	N/A
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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