



# DRAFT ENERGY STAR Qualified Homes 2011 Inspection Checklists

To qualify as ENERGY STAR, a home must meet the requirements of the six attached checklists:

- Thermal Bypass Inspection Checklist
- Quality Framing Checklist
- HVAC Quality Installation Contractor Checklist
- HVAC Quality Installation Rater Checklist
- Indoor Air Quality Checklist
- Water-Managed Construction Checklist

A home must also meet the other requirements of either the performance or the prescriptive path, meet the mandatory requirements for all qualified homes, be verified and field-tested in accordance with HERS Standards by a Rater<sup>1</sup>, and meet all applicable codes. State, local, and regional code requirements that are more rigorous than those specified should always take precedence. In addition, state, local, and regional code requirements; engineering calculations; manufacturers' installation instructions; and regional ENERGY STAR program requirements that conflict with the scopes of work specified supersede the items in these checklists.

Raters are expected to use their experience and discretion in verifying that each checklist item is installed per the inspection guidelines (i.e., identifying minor defects that the Rater deems acceptable versus identifying major defects that undermine the intent of the checklist item).

Alternative methods of meeting the checklist requirements may be used if the Provider deems them to be equivalent to or more stringent than the checklist guidelines. The column titled "N/A," which denotes items that are "not applicable," should be used when the checklist item is not present in the home or when code, engineering, manufacturer, or regional program requirements take precedence.

In the event that an item on the checklist cannot be inspected by the Rater, the home cannot be qualified as ENERGY STAR. The only exceptions to this rule are in the Thermal Bypass Inspection and Water-Managed Construction Checklists, where the builder may assume responsibility for verifying that a small subset of items have met the requirements of those checklists. This option is only at the discretion of the Rater, and may not be used to verify more than the permissible number of items specified in each checklist (i.e., four for the Thermal Bypass Inspection Checklist and three for the Water-Managed Construction Checklist). When exercised, the builder's responsibility will be formally acknowledged by the builder signing off on the checklist for the item(s) that they verified.

The checklists may be completed for a batch of homes using a RESNET-approved sampling protocol to qualify homes as ENERGY STAR. For example, if the approved sampling protocol requires rating one in seven homes, then all of the checklists must be completed for the one required rating.

In the event that a Rater finds an item that is inconsistent with the checklist guidelines, the home cannot be qualified as ENERGY STAR until the item is corrected. If correction of the item is not possible, the home cannot earn the ENERGY STAR.

The Rater is required to keep hard copies of the completed and signed checklists. The builder's signature is also required if the builder verified compliance with any item on the two applicable checklists. The signature of the HVAC technician is required if any of the HVAC equipment specified on the HVAC Quality Installation Contractor Checklist is installed in the home.

Rater Name: _____  Rater Company Name: _____  Builder Company Name: _____  HVAC Company Name: _____
---



# ENERGY STAR Qualified Homes 2011 Inspection Checklist Notes

1. The term "Rater" refers to the person completing the third-party inspections required for qualification. Depending on the compliance path selected, this party may be a certified Home Energy Rater, BOP Inspector, or an equivalent designation as determined by a Verification Oversight Organization such as RESNET.

DRAFT



# ENERGY STAR Qualified Homes 2011 Thermal Bypass Inspection Checklist

Home Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Thermal Bypass	Inspection Guidelines <sup>1</sup>	Must Correct	Builder Approved <sup>2</sup>	Rater Approved	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	Insulation installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under item 2, <i>Walls Adjoining Exterior Walls or Unconditioned Spaces</i>				
	<b>All Climate Zones</b>				
	1.1 Overall alignment of insulation throughout home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Grade I insulation installation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.3 Garage band joist air barrier in place <sup>3</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.4 Attic eave baffles in place where vents/leakage exist <sup>4</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Climate Zones 4 and Higher</b>				
	1.4 Slab edge insulation properly installed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Best Practices Encouraged, but Not Required</b>					
	1.5 Air barrier in place at all band joists <sup>5</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	<ul style="list-style-type: none"> <li>Fully insulated wall aligned with air barrier at both interior and exterior, <b>OR</b>;</li> <li>Alternate for Climate Zones 1 through 3, sealed exterior air barrier aligned with fully supported RESNET Grade I insulation</li> <li>Continuous top and bottom plates in place or sealed blocking used</li> </ul>				
	2.1 Walls insulated behind showers and tubs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Walls insulated behind fireplaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 Attic slopes and walls insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.4 Attic knee walls insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.5 Skylight shaft walls insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.6 Wall adjoining porch roof insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.7 Staircase walls insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.8 Double walls insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Floors Between Conditioned and Exterior Spaces	<ul style="list-style-type: none"> <li>Air barrier installed at any exposed fibrous insulation edges</li> <li>Insulation installed to maintain permanent contact with sub-floor above, including necessary supports<sup>6</sup></li> <li>Blanket insulation verified to have no gaps, voids, or compression</li> <li>Blown-in insulation verified to have proper density with firm packing</li> </ul>				
	3.1 Floor insulated above garage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2 Cantilevered floors insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Shafts	Openings to unconditioned space fully sealed with solid blocking or flashing and any remaining gaps sealed with caulk or foam (fire-rated collars and caulking installed where required)				
	4.1 Duct shafts sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.2 Piping shafts and penetrations sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.3 Flue shafts sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Attic / Ceiling Interface	<ul style="list-style-type: none"> <li>All surfaces and dropped ceilings include a full interior-side air barrier aligned with insulation</li> <li>All penetrations and gaps fully sealed with caulk, foam, or tape and any flashing as required</li> </ul>				
	5.1 Sheetrock to top plate at all attic/wall interfaces fully sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.2 Attic access panels and drop down stairs sealed <sup>7</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.3 Dropped ceilings and soffits sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.4 Airtight recessed lighting fixtures installed <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5.5 Whole-house fans have insulated cover gasketed to opening	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Common Walls Between Dwelling Units	Gap between drywall shaft wall (i.e., common wall) and the structural framing between units fully sealed at all exterior boundary conditions				
	6.1 Common wall between dwelling units sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Rater Name: \_\_\_\_\_ Rater Inspection Date: \_\_\_\_\_ Rater Initials: \_\_\_\_\_

Builder Employee: \_\_\_\_\_ Builder Inspection Date: \_\_\_\_\_ Builder Initials: \_\_\_\_\_



# ENERGY STAR Qualified Homes 2011 Thermal Bypass Inspection Notes

1. For purposes of this checklist, an air barrier is defined as any solid material that blocks air flow between conditioned space and unconditioned space, including necessary sealing to block excessive air flow at edges and seams. Additional information on proper air sealing of thermal bypasses can be found on the Building America Web site ([www.eere.energy.gov/buildings/building\\_america](http://www.eere.energy.gov/buildings/building_america)) and in the EEBA Builder's Guides ([www.eeba.org](http://www.eeba.org)). These references include guidance on identifying and sealing air barriers as well as details on many of the items included in the checklist.
2. At the discretion of the Rater, the builder may verify no more than four items specified in this checklist. When exercised, the builder's responsibility will be formally acknowledged by the builder signing off on the checklist for the item(s) that they verified.
3. Air barriers shall be installed at bays adjoining conditioned space.
4. Wind baffles shall be installed in every bay at eaves for attics with ceiling insulation.
5. An air barrier at all band joists is recommended **but not required** in Climate Zones 4 and higher.
6. Examples of necessary supports include staves for batt insulation or netting for blown-in insulation.
7. Attic access panels and attic drop-down stairs must be fully gasketed and insulated.
8. Recessed lighting fixtures must be ICAT labeled and sealed to the drywall.

DRAFT



# ENERGY STAR Qualified Homes 2011 Quality Framing Checklist & Notes

Home Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Inspection Guidelines		Must Correct	Rater Approved	N/A
1. Attic Framing	1.1 Raised-heel truss installed in the attic <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Raised platform installed for HVAC air handler <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Exterior Above-Grade Walls	2.1 Optimum Value Engineered (OVE) framing including all of the below:			
	2.1.1 All corners insulated to edge <sup>3</sup> , <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.1.2 All headers above windows & doors insulated <sup>4</sup> , <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.1.3 Framing limited at all windows & doors <sup>5</sup> , <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.1.4 All interior / exterior wall intersections insulated <sup>6</sup> , <b>AND</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.1.5 Unnecessary studs have been eliminated <sup>7</sup> , <b>OR</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Continuous insulated sheathing, <b>OR</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 Structural Insulated Panels (SIPs), <b>OR</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.4 Insulated Concrete Forms (ICFs), <b>OR</b> ;	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5 Double wall framing <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Rater Name: \_\_\_\_\_ Rater Inspection Date: \_\_\_\_\_ Rater Initials: \_\_\_\_\_

1. Raised-heel trusses shall elevate the roof adequately for full-depth attic insulation at the attic perimeter. Alternatively, construct a conditioned attic.
2. HVAC air handler platform in unconditioned attics shall be framed to allow full-depth insulation below.
3. All exterior corners shall have insulation extend to exterior wall sheathing using either "California Corners" (i.e., two studs in 'L' configuration with furring or drywall clips as needed to support drywall) or equivalent alternative framing technique.
4. Minimum R-5 insulated headers shall be provided with prefabricated insulated headers, two-ply headers with insulation between, single-ply headers insulated on one side, or equivalent assembly.
5. Framing at windows shall be limited to a maximum of two king/jack studs to support the header and window sill and the use of additional jack studs only as needed for structural support.
6. Insulation shall run continuously behind interior/exterior wall intersections using ladder blocking, full length 2"x6" or 1"x6" furring behind the first partition stud, drywall clips, or other equivalent alternative.
7. Continuous vertical framing member extending from the bottom plate to the top plate shall **not** be adjacent to any other such framing member unless specified in structural engineered framing layout. In addition, spacing of framing shall conform to specifications on construction documents except for variations needed to accommodate apertures and plan dimensions.
8. Double walls shall include two independently framed walls with all framing offset and continuous insulation except at windows, doors and other penetrations.



# ENERGY STAR Qualified Homes 2011 Inspection Checklists

(Intentionally Left Blank)

DRAFT



# ENERGY STAR Qualified Homes 2011 HVAC Quality Installation Contractor Checklist<sup>1,2</sup>

Home Address: _____ City: _____ State: _____			
<b>Equipment Specification, Design, and Documentation</b>			
1. Equipment	1.1 Condenser mfr., model, & serial #:		
	1.2 Evaporator mfr., model, & serial #:		
	1.3 <b>ARI</b> reference number:		
2. Design	2.1 Heat gain calculation method compliant with Manual J or equivalent, using the following assumptions? <sup>1</sup>	Yes / No	
	2.1.1 Outdoor design temperature: a) 99.0% design as published in ASHRAE Handbook of Fundamentals, <u>OR</u> b) Based on prevailing local practice reflecting documented weather data	Yes / No Yes / No	
	2.1.2 Indoor setpoint set at 75°F	Yes / No	
	2.1.3 Infiltration rate set at 'Tight'	Yes / No	
	2.2 Duct design method compliant with Manual D or equivalent? <sup>3</sup>	Yes / No	
	2.3 Equipment specification method compliant with Manual S or equivalent? <sup>3</sup>	Yes / No	
	2.4 Terminal design method compliant with Manual T or equivalent? <sup>3</sup>	Yes / No	
	2.5 In warm, humid counties in Climate Zones 1 - 3, equipment's sensible heat ratio ≤ 0.70 or stand-alone ENERGY STAR qualified dehumidifier installed? <sup>4</sup>	Yes / No / N/A	
2.6 Corrosion-resistant drain pan, properly sloped to drainage system <sup>5</sup>	Yes / No		
3. Documentation	3.1 <b>ARI</b> certificate attached?	Yes / No	
<b>Field Verification</b>		<b>Design Value</b>	<b>Field Value</b>
4. Equipment Capacity	4.1 <b>Latent heat gain</b> (Btu/h): <sup>6</sup>		
	4.2 <b>Sensible heat gain</b> (Btu/h): <sup>6</sup>		
	4.3 <b>Total heat gain</b> (Btu/h): <sup>6</sup>		
5. Air Flow	5.1 <b>Airflow at evaporator</b> (CFM): <sup>6,7</sup>		
	5.2 Duct static pressure – supply (WC): <sup>6</sup>		
	5.3 Duct static pressure – return (WC): <sup>6</sup>		
	5.4 Fan motor type (fixed speed, variable speed):		N/A
	5.5 Fan speed setting (CFM): <sup>6</sup>		
6. Refrigerant Charge <sup>8</sup>	6.1 Refrigerant type (R-22, R-410a):		N/A
	6.2 Metering device (TXV, fixed orifice):		N/A
	6.3 Return air temp. (°F dry bulb / °F wet bulb): <sup>9</sup>	N/A	N/A
	6.4 Supply air temp. (°F dry bulb / °F wet bulb): <sup>9</sup>	N/A	N/A
	6.5 Outdoor ambient air temp. at condenser (°F dry bulb):	N/A	N/A
	6.6 Liquid line temperature & pressure (°F / psi):	N/A	N/A
	6.7 Suction line temperature & pressure (°F / psi):	N/A	N/A
	6.8 Condensing temperature (°F): <sup>10</sup>	N/A	N/A
	6.9 Evaporating temperature (°F): <sup>11</sup>	N/A	N/A
	6.10 For non-Lennox TXV devices: Subcooling temp. (condensing temp – liquid line temp.) <sup>12</sup>		
	6.11 For Lennox TXV devices: Approach temp. (liquid line temp. – outdoor ambient temp.) <sup>13</sup>		
	6.12 For fixed orifice devices: Superheat temp. (suction line temp. – evaporating temp.) <sup>14</sup>		
Technician Name: _____ Equipment Installation Date: _____			
Technician Signature: _____ Company Name: _____			



# ENERGY STAR Qualified Homes 2011 HVAC Quality Installation Contractor Notes

1. This checklist applies to split air conditioners, unitary air conditioners, and air-source/water-source heat pumps up to 65,000 Btu/h. All other equipment is exempt.
2. This checklist shall be provided by the Rater to the HVAC contractor who shall complete one checklist for each system. Upon completion, the HVAC contractor shall return the checklist(s) to the Rater for review.
3. Cooling loads shall be calculated, equipment capacity shall be selected, and duct systems shall be sized according to the latest editions of ACCA Manuals J, S, D, & T, respectively, ASHRAE 2005 Handbook of Fundamentals, or an equivalent procedure. Maximum oversizing limit for air conditioners and air-source and ground-source heat pumps is 15% with the exceptions that single-speed air-source and ground-source heat pumps in buildings with heating loads that exceed cooling loads have a limit of 25%; and multi-stage heat pumps do not have a strict limit, but should be sized to allow adequate humidity control in the cooling mode. The following operating conditions must be used in the sizing calculations:

**Outdoor temperatures** must be the 99.0% design temperatures as published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available. Note that a higher outdoor air design temperature may be used if it represents prevailing local practice by the HVAC industry and reflects extreme climate conditions that can be documented with recorded weather data;

**Indoor temperatures** must be 75°F for cooling, and;

**Infiltration rate** must be selected as "tight", or the equivalent term.

In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils must be matched in accordance with ARI standards.

4. Equipment shall have a sensible heat ratio  $\leq 0.70$  or an ENERGY STAR qualified stand-alone dehumidifier must be installed in home. This requirement applies only to homes that are located in both Climate Zones 1, 2 or 3 and in Warm, Humid counties as identified by Tables N1101.2 and N1101.2.1 of the 2004 Supplement to the IRC, respectively.
5. Corrosion-resistant materials include stainless steel and plastic. Drain pan shall drain condensate line to drainage system, rather than just depositing underneath foundation.
6. Measured field value shall be within 5% of design value.
7. Measured air volume shall be determined using a "true flow" anemometer or pressure matching (i.e., duct blaster).
8. Climate conditions, such as cold weather, may make it impossible to verify proper refrigerant charge. In such cases, a TXV must be installed.
9. Air temperatures shall be measured in ducts near evaporator and not in conditioned building space.
10. Calculated using liquid line pressure measured value.
11. Calculated using suction line pressure measured value.
12. Field value must be within 3°F of design value.
13. Field value must be within 1°F of design value.
14. Field value must be within 5°F of design value.





# ENERGY STAR Qualified Homes 2011 HVAC Quality Installation Rater Checklist

**For Raters Only:** The HVAC Quality Installation Contractor Checklist must be completed by the HVAC contractor. Please review the checklist using the form below to help ensure that the equipment was installed to design specifications.

Home Address: _____ City: _____ State: _____			
Inspection Guidelines	Must Correct	Rater Approved	N/A
<b>1. Review of HVAC Quality Installation Contractor Checklist</b>			
1.1. Checklist completed in its entirety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2. Compliance with Manual J, S, D, and T or equivalents indicated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3. Compliance with SHR or dehumidifier requirement indicated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4. Required outdoor / indoor temperature and infiltration rate assumptions used to complete Manual J calculations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5. ARI certificate attached	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6. Reported equipment capacity field values within 5% of design values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.7. Reported air flow field values within 5% of design values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8. Reported duct static pressure field values within 5% of design values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.9. Reported design fan motor type same as field fan motor type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.10. Reported fan speed field values within 5% of design values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.11. Reported refrigerant charge and metering device field types same as design types	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.12. For Non-Lennox TXV devices, reported sub-cooling temperature deviation within +/- 3°F of goal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.13. For Lennox TXV devices, reported approach temperature deviation +/- 1°F of goal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.14. For Fixed Orifice devices, reported superheat temperature deviation +/- 5°F of goal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>2. Duct Quality Installation</b>			
2.1. Connections and routing of ductwork completed without kinks or bends > 90° <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2. No excess coiled or looped flexible ductwork <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3. No compression of flexible ductwork <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4. Flexible ducts supported at intervals as recommended by manufacturer but at a distance not > 5 ft. and with maximum sag of 0.5 in. per ft. of spacing between supports <sup>1</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5. All connections to trunk ducts in unconditioned space insulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6. Building cavities not used as return ducts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7. Ducts in unconditioned attics have insulation ≥ R-8; All other ducts in unconditioned space have insulation ≥ R-6. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8. Total duct leakage ≤ 6 CFM per 100 sq. ft. of conditioned floor area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.9. Duct leakage to outdoors ≤ 4 CFM per 100 sq. ft. of conditioned floor area <sup>2,3,4</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.10. Bedrooms pressure-balanced such that 1 sq. in. of opening is provided per 1 CFM of supply air. Dedicated return ducts, transfer grills, and/or jump ducts may be used to meet this requirement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rater Name: _____ Date Checklist Inspected: _____			
Rater Signature: _____ Rater Company Name: _____			



# ENERGY STAR Qualified Homes 2011 HVAC Quality Installation Rater Notes

1. Scope of work applies to all HVAC and ventilation ductwork.
2. EPA recommends, but does not require, locating ducts within conditioned space (i.e., inside the air and thermal barriers), and using a minimum of R-4 insulation for ducts inside conditioned space to prevent condensation.
3. Duct leakage shall be determined and documented by a Rater using a RESNET-approved or equivalent ASTM-approved testing protocol.
4. If total duct leakage is less than the required value, then leakage to outdoors does not need to be tested. Duct leakage testing can be waived if all ducts and air handling equipment are located in conditioned space (i.e., within the home's air and thermal barriers) AND the envelope leakage has been tested to be  $\leq 3$  ACH50 OR  $\leq 0.25$  CFM 50 per sq. ft. of the building envelope.

DRAFT



# ENERGY STAR Qualified Homes 2011 Indoor Air Quality Checklist

Home Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

System	Inspection Guidelines	Must Correct	Rater Approved	N/A		
<b>Ventilation<sup>1</sup></b>						
1. Whole-Building Delivered Ventilation <sup>2</sup>	1.1 Ventilation rate meets requirements of ASHRAE Std. 62.2 2007, Section 4.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	1.2 In hot-humid climates, net exhaust flow $\leq 7.5$ CFM per 100 sq. ft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	1.3 In very cold climates, net supply flow $\leq 7.5$ CFM per 100 sq. ft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2. Local Mechanical Exhaust	System installed in each kitchen and bathroom and meets one of the following airflow standards:					
	<b>Location</b>	<b>Continuous Rate:</b>	<b>Intermittent Rate:<sup>3</sup></b>			
	2.1 Kitchen	$\geq 5$ ACH, based on kitchen volume <sup>4</sup>	$\geq 100$ CFM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Bathroom	$\geq 20$ CFM	$\geq 50$ CFM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 If fans share common exhaust duct, back-draft dampers installed			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.4 Common exhaust duct not shared by fans in separate dwellings			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.5 Total net exhaust flow of two largest exhaust fans (excluding summer cooling fans) is $\leq 15$ CFM / 100 sq. ft. of occupiable space when at full capacity <sup>5</sup>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.6 Clothes dryers exhaust vented directly to outdoors <sup>6</sup>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Fan Sound Ratings <sup>7</sup>	3.1 Continuous fans rated at $\leq 1$ sone at minimum rated flow rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	3.2 Intermittent fans rated at $\leq 3$ sone, unless maximum rated flow rate $\geq 400$ CFM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4. Controls	4.1 Continuously-operating ventilation system and mechanical exhaust fans designed to operate without occupant intervention during all occupiable hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	4.2 Readily accessible override controls provided to occupant for continuously-operating ventilation system and mechanical exhaust fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	4.3 If present, intermittently-operating ventilation system designed to automatically operate at least one hour out of every twelve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	4.4 Controls labeled, unless function is obvious (e.g., bathroom exhaust fan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5. Air Inlets & Ventilation Source	5.1 Air inlets located $\geq 10$ ft. from stack, vent, exhaust hood, or vehicle exhaust and $\geq 3$ ft. from dryer exhaust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	5.2 Air inlets unable to be obstructed by snow, plantings, or other material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	5.3 Air inlets provided with mesh rodent / insect screen with openings $\leq 0.5$ in.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	5.4 Ventilation air comes directly from outdoors and not from adjacent dwelling units, garages, unconditioned crawlspaces, or attics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Combustion Pollutants</b>						
6. Garage Isolation	6.1 Air-handler and return ducts <u>not</u> located within the garage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	6.2 Garage doors adjacent to occupiable spaces gasketed or made airtight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7. Appliances and Detectors	7.1 No ventless combustion appliances installed, except for kitchen cooking devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	7.2 One carbon monoxide detector, certified by CSA 6.19-01 or UL 2034, installed in central location near sleeping areas for homes with combustion appliances or attached garage <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Filtration</b>						
8. HVAC Filter	8.1 $\geq$ MERV 8 filter installed in ducted mechanical systems <sup>9</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	8.2 Filter located so that return and ventilation air pass through prior to conditioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	8.3 Filter accessible for maintenance by owner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	8.4 Filter rack fitted with flexible, air-tight gasketing on the surface that contacts the downstream side of the filter, or equivalent method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	8.5 Filter held firmly in place by friction-fit spring clips in the filter rack, installed on the upstream side of the filter, or equivalent method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Rater Name: _____		Rater Inspection Date: _____		Rater Initials: _____		



# ENERGY STAR Qualified Homes 2011 Indoor Air Quality Notes

1. For proper procedures, exceptions, selection methods, and alternate methods to the Indoor Air Quality Checklist, see the ASHRAE Standard 62.2 - 2007. All components shall be designed and installed per manufacturers' requirements and local codes.
2. The system shall have at least one supply or exhaust fan with associated ducts and controls. Local exhaust fans are allowed to be part of an exhaust ventilation system. Outdoor air ducts connected to the return side of an air handler are allowed to be part of a supply ventilation system if manufacturers' requirements for return air temperature are met. The airflow required by this standard refers to the delivered airflow of the system as installed and tested using a flow hood, flow grid, or other airflow measuring device.
3. An intermittent mechanical exhaust system where provided shall be designed to operate as needed by the occupant. Control devices shall not impede occupant control in intermittent systems.
4. A vented range hood, or appliance-range hood combination, is required if exhaust fan flow rate is  $< 5$  kitchen ACH.
5. If net exhaust flow exceeds allowable limit, net exhaust flow shall be reduced or compensating outdoor airflow provided. Net exhaust flow requirement is exempted if no atmospherically vented combustion or solid-fuel burning appliances are located inside the pressure boundary.
6. Electric condensing dryers equipped with condensate drain need not be vented.
7. Fans exempted from this requirement include HVAC air handlers and remote-mounted fans (i.e., fans outside habitable spaces and with  $\geq 4$  ft. ductwork between fan and intake grills.)
8. Carbon monoxide detectors shall be placed according to NFPA 720 and be hard-wired with a battery back-up function.
9. Manufacturer filter media boxes designed to accomplish these purposes meet these requirements.

DRAFT



# ENERGY STAR Qualified Homes 2011 Water-Managed Construction Checklist

Home Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

Assembly	Inspection Guidelines	Must Correct	Builder Approved <sup>1</sup>	Rater Approved	N/A
1. Water-Managed Foundation	1.1 Patio slabs, walks, and driveways sloped $\geq 0.25$ in. per ft. away from home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Final grade sloped $\geq 0.5$ in. per ft. away from home for $\geq 10$ ft. and back-fill tamped to prevent settling <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.3 Capillary break beneath all concrete slabs using either: <sup>3</sup> <ul style="list-style-type: none"> <li>4 in. bed of <math>\geq 0.5</math> in. clean aggregate covered with sheeting in direct contact with the concrete slab above, OR;</li> <li>4 in. uniform layer of sand overlaid with geotextile drainage matting and covered with sheeting</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.4 Capillary break for all crawlspace floors using either: <sup>4</sup> <ul style="list-style-type: none"> <li>Concrete slab over lapped polyethylene sheeting, OR;</li> <li>6 mil polyethylene sheeting, lapped 6-12 in. and sealed at seams, attached to walls and piers with adhesive and furring strips</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.5 Exterior surface of below-grade walls finished as follows: <ul style="list-style-type: none"> <li>For poured concrete, concrete masonry, and insulated concrete forms, finish with damp-proofing coating</li> <li>For wood framed walls, finish with trowel-on mastic and polyethylene or other equivalent waterproofing</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.6 Interior surface of below-grade walls <u>not</u> finished with continuous vapor barrier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.7 Sump pump covers shall be air-sealed (i.e., mechanically attached with full gasket seal or equivalent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.8 Protected drain tile surrounded with clean gravel and fabric filter <sup>5</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Water-Managed Wall Assembly	2.1 Flashing at bottom of exterior walls with weep holes included for masonry veneer and weep screed for stucco cladding systems <sup>6</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Fully sealed continuous drainage plane behind exterior cladding that laps over flashing in Section 2.1 <sup>7</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 Window and door openings fully flashed <sup>8</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Water-Managed Roof Assembly	3.1 Step and kick-out flashing at all roof-wall intersections, extending $\geq 4$ " on wall surface above roof deck and integrated with drainage plane above <sup>9</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.2 Guttering and downspouts empty to lateral piping that deposits water on sloping finish grade $\geq 5$ ft. from foundation or to underground catchment system $> 10$ ft. from foundation <sup>10,11</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.3 Self-sealing bituminous membrane or equivalent at all valleys and roof decking penetrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3.4 In IECC 2006 Climate Zones 5 and higher, self-sealing bituminous membrane or equivalent over sheathing at eaves, extending $\geq 2$ ft. up roof deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Building Materials	4.1 Wall-to-wall carpet <u>not</u> installed adjacent to toilets and bathing fixtures (e.g., tubs and showers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.2 Cement board or equivalent moisture-resistant backing material installed behind tub and shower enclosures <sup>12</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.3 Piping in exterior walls installed with insulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.4 In Humid-Hot and Humid-Mixed climates, permeability rating of finishes used on interior side of exterior walls is $> 1$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.5 Building materials with visible signs of water damage or mold <u>not</u> installed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4.6 Interior walls <u>not</u> enclosed (e.g., with drywall) if either the framing members or insulation products have high moisture content <sup>13</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Rater Name: \_\_\_\_\_ Rater Inspection Date: \_\_\_\_\_ Rater Initials: \_\_\_\_\_

Builder Employee: \_\_\_\_\_ Builder Inspection Date: \_\_\_\_\_ Builder Initials: \_\_\_\_\_



# ENERGY STAR Qualified Homes 2011

## Water-Managed Construction Notes

1. In the event that an item cannot be inspected by the Rater, the builder may assume responsibility for verifying that the item has met the requirements of the checklist. This option is available at the discretion of the Rater but may not be used to verify more than three (3) items on the checklist. This responsibility will be formally acknowledged by the builder signing off on the checklist for the item(s) that they verified.
2. Where setbacks limit space to less than 10 ft., provide swales or drains designed to carry water from foundation. Backfill tamping is not required if proper drainage can be achieved using non-settling compact soils, as determined by a certified hydrologist, soil scientist, or engineer.
3. Sheeting shall be  $\geq 6$  mil polyethylene sheeting overlapped 6-12 in. at joints. Polyethylene sheeting is not required in Dry (B) climates as defined by IECC 2004 Figure 301.1, except in U.S. EPA Zone 1 Radon areas. In areas with free-draining soils, identified as Group 1 in the IRC by a certified hydrologist, soil scientist, or engineer through a site visit, a gravel layer or geotextile matting is not required.
4. It is recommended, but not required, that sheeting be  $\geq 10$  mil polyethylene. Polyethylene sheeting is not required for raised-pier foundation with no walls, in Dry (B) climates as defined by IECC 2004 Figure 301.1, or in Marine climates as defined by IECC 2004 Figure 301.1 and Table 301.1 if no air handler or return ducts are installed in the crawlspace.
5. Protected drain tile shall be installed at the footings of basement and crawlspace walls, level or sloped to discharge to outside grade (daylight) or to a sump pump. The top of each drain tile pipe shall always be below the bottom of the concrete slab or crawlspace floor. Each pipe shall be surrounded with at least 6 inches of  $\frac{1}{2}$  to  $\frac{3}{4}$  inc. washed or clean gravel. The gravel layer shall be fully wrapped with fabric cloth to prevent fouling of the drain tile.
6. Drainage systems equivalent to flashing are also allowed.
7. Any of the following systems may be used: a monolithic weather-resistant barrier (i.e., house wrap) sealed or taped at all joints; weather resistant sheathings (e.g., faced rigid insulation) fully taped at all "butt" joints; or lapped shingle-style building paper or felts.
8. Include pan flashing at sills, side flashing that extends over pan flashing, and top flashing that extends over side flashing.
9. Intersecting wall siding shall terminate 1 in. above the roof, or higher per manufacturer's recommendations. Continuous flashing shall be installed in place of step flashing for metal and rubber membrane roofs.
10. Not required in dry climates as shown in IECC 2004 Figure 301.1 and Table 301.1.
11. Roof design without gutters is also acceptable if it deposits rainwater to a grade-level rock bed with a waterproof liner and a drain pipe that deposits water on a sloping finish grade  $\geq 5$  ft. from foundation. Rainwater harvesting systems may also be used to meet this requirement when designed to properly drain overflow, meeting the discharge-distance requirements above.
12. Paper-faced wall board does not meet this requirement.
13. For wet-applied insulation products, follow manufacturer's drying recommendations. As guidance, note that lumber should not exceed 18% moisture content.