

## 2006/07 New York ENERGY STAR® Labeled Homes Technical Specifications



### 1) ENERGY STAR Labeled Homes:

All New York ENERGY STAR Labeled Homes shall meet the requirements set for EPA’s ENERGY STAR Labeled Homes. Compliance shall be demonstrated by meeting either the performance standard (i.e., a minimum expanded Home Energy Rating System (HERS) Score of 84.0<sup>1</sup>), or the New York ENERGY STAR Builder Option Package (“BOP”).

- a. If utilizing the performance standard, the Final HERS Rating shall:
  - i. Score an 84.0 or higher according to RESNET accredited rating software (e.g. REM/Rate or TREAT) listed at [www.resnet.us/programs/software/directory.htm](http://www.resnet.us/programs/software/directory.htm), that conforms to the 2006 RESNET technical standards.
  - ii. Reflect accurate conditions of the building at the time of completion.
  - iii. Meet all New York State specific additional requirements (as listed below).
- b. If utilizing the New York Builder Option Package, the building at the time of completion shall:
  - i. Meet all New York State specific BOP requirements as listed in the BOP document.

### 2) New York State Code Requirements:

All homes constructed under the provisions of this program must meet or exceed provisions for the applicable Codes of the State of New York.

### 3) Electrical kWh Savings:

- a. Electrical savings levels can be achieved by installing a mixture of compact fluorescent lamps, fluorescent lighting fixtures, efficient appliances, ceiling fans equipped with efficient lighting fixtures and furnace or air handler equipped with variable speed ECM motors.
- b. All lighting, appliances, ceiling fans equipped with efficient lighting fixtures and ventilation fans shall have the “ENERGY STAR®” label.
- c. ENERGY STAR labeled lighting fixtures or lamps (CFLs) shall be installed in high usage areas in order to count towards the requirements (i.e. primary living space, including finished basements, walk-in closets, and outdoor lighting, and excluding closets, garages, and unfinished basements).
- d. Lighting, appliances and furnace or handler variable speed ECM motors will be credited with kWh savings according to Table 1 as follows:

<b>Table 1. Labeled Homes Electrical Savings</b>						
<b>ENERGY STAR Labeled Lighting</b> (including lighting in ceiling fans)		<b>ENERGY STAR Labeled Appliances<sup>2</sup></b>				<b>ECM Motors</b>
ENERGY STAR Labeled Lamps (screw-based CFL “bulbs”)	ENERGY STAR Labeled Fixtures	ENERGY STAR Labeled Refrigerator	ENERGY STAR Labeled Freezer	ENERGY STAR Labeled Dish Washer	ENERGY STAR Labeled Clothes Washer	400 kWh per air handling unit
50 kWh each	75 kWh each	100 kWh each	50 kWh each	50 kWh each	75 kWh each	

<sup>1</sup> Note: Equivalent to a maximum HERS “Index” of 80. New York will continue using a HERS “Score” rather than a HERS “Index” as the determination of Program compliance. The Score is calculated as: HERS Score = 80 + (100 - HERS Index)/5.

<sup>2</sup> The term ENERGY STAR Labeled Appliances does not include HVAC equipment as used for the purposes of this program.

- e. The mix of appliances, lighting fixtures, CFLs and ECM motors that can be used to meet the kWh requirement depends on whether the builder is supplying the major appliances and on the level of incentive being claimed for the home. Requirements for homes claiming different levels of incentives are summarized in Table 2 below:

<b>Table 2. Requirements for Appliances, Lighting and ECM Motors</b>				
<b>Tier</b>	<b>Expanded HERS Score</b>	<b>Appliances Provided by Builder?</b>	<b>kWh Requirement</b>	<b>Combination of ENERGY STAR appliances, lighting &amp; ECM motors needed to meet kWh requirement</b>
Tier 1	84.0-86.9 or BOP	Yes	500 kWh	1 ENERGY STAR Labeled Appliance <b>AND</b> Any combination of additional ENERGY STAR lighting and ECM motors.
Tier 1	84.0-86.9 or BOP	No	500 kWh	No appliance is <i>required</i> , but Builder must promote ENERGY STAR appliances with Program literature. <b>AND</b> Any combination of ENERGY STAR lighting and ECM motors may be used to meet this requirement.
Tier 2	87.0-88.9	Yes	500 kWh	1 ENERGY STAR Labeled Appliance <b>AND</b> Any combination of additional ENERGY STAR lighting and ECM motors.
Tier 2	87.0-88.9	No	500 kWh	No appliance is <i>required</i> , but Builder must promote ENERGY STAR appliances with Program literature. <b>AND</b> Any combination of ENERGY STAR lighting and ECM motors may be used to meet this requirement.
Tier 3	89.0 or higher	Yes	500 kWh	2 ENERGY STAR Labeled appliances <b>OR</b> 1 ENERGY STAR Labeled appliance + 2 ENERGY STAR Labeled fixtures <b>AND</b> any combination of additional ENERGY STAR lighting and ECM motors
Tier 3	89.0 or higher	No	500 kWh	No appliance is <i>required</i> , but Builder must promote ENERGY STAR appliances with Program literature. <b>AND</b> Any combination of ENERGY STAR lighting and ECM motors may be used to meet this requirement.
Tiers 4 and 5	Display and Model Homes of any HERS Rating	Yes (required)	650 kWh	2 ENERGY STAR Labeled appliances <b>OR</b> 1 ENERGY STAR Labeled appliance + 2 ENERGY STAR Labeled fixtures <b>AND</b> any combination of additional ENERGY STAR lighting and ECM motors

**4) Tight Homes:**

- a. All homes submitted through the NYESLH Program shall have 5 or less Air Changes per Hour measured at a pressure difference of 50 pascals (ACH<sub>50</sub>).
- b. An “ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist” shall be completed for all homes submitted through the NYESLH Program.

**5) Mechanical Ventilation:**

- a. Automatically controlled mechanical ventilation shall be installed to meet the following requirements for design air flow:

New York ENERGY STAR® Labeled Homes		2006 Minimum Ventilation Requirements (cfm)					
		<----- Number of Bedrooms ----->					
House Square Footage		2	3	4	5	6	7
Less than	1,000	45	60	75	90	105	120
1,000 to	1,500	45	60	75	90	105	120
1,501 to	2,000	45	60	75	90	105	120
2,001 to	2,500	48	60	75	90	105	120
2,501 to	3,000	53	60	75	90	105	120
3,001 to	3,500	58	65	75	90	105	120
3,501 to	4,000	63	70	78	90	105	120
4,001 to	4,500	68	75	83	90	105	120
4,501 to	5,000	73	80	88	95	105	120
5,001 to	5,500	78	85	93	100	108	120
5,501 to	6,000	83	90	98	105	113	120

Notes:

This chart represents a conservative combination of the ventilation requirements as included in the Residential Code of New York State, the Mechanical Code of New York State and the ASHRAE Standard 62.2-2004. It includes the minimum ventilation requirements for New York ENERGY STAR® Labeled Homes for 2006. As an alternative, the larger result of equations 1 and 2 below can be used.

- a. As an option, the mechanical ventilation requirement can be met by meeting the larger result of Equation 1 and Equation 2 as follows:
  - 1. Equation 1: 15 CFM for each Bedroom + 1 Additional Bedroom
  - 2. Equation 2: 7.5 CFM for each Bedroom + 1 Additional Bedroom + .01 x Conditioned Floor Area
- b. The program recommends spot ventilation in all kitchens and bathrooms. When installed, kitchen exhaust fans shall have a minimum ventilation rate of 100 CFM intermittent or 25 CFM continuous and bathroom exhaust fans shall have a minimum ventilation rate of 50 CFM intermittent or 20 CFM continuous.
- c. For homes with exhaust only mechanical ventilation systems, ventilation fans shall be ENERGY STAR® labeled (energy recovery ventilators and remote/in-line fans are exempt).
- d. The ventilation system shall be installed to operate automatically without occupant intervention. However, a readily accessible override control shall be provided to the occupant. Examples of commonly available controls are provided in the sample ventilation cut sheet.
- e. Provisions shall be made to ensure sufficient make-up air is provided to the building whenever air is exhausted in accordance with the requirements of Chapter 17 of the Residential Code of New York State or Chapter 7 of the Mechanical Code of New York State.

## 6) **Insulation Installation:**

- a. Insulation shall be installed to the requirements listed in the 'EPA Codes & Standards.'
- b. Insulation should be installed to manufacturer's specifications, with no gaps, voids or compressions, including around electrical boxes, around pipes and in corners. This is **required** when utilizing the National Builder Option Package.
- c. Raters are required to input the insulation performance based on actual quality of installation, not what appears on the label. The home's overall rating may lose points based on lower insulation R-values because of workmanship.

## 7) **Heating:**

- a. Heating equipment other than heat pumps shall be sized according to the latest editions of ASHRAE 2001 Handbook of Fundamentals, IBR (the Hydronic Institute Division of GAMA), or an equivalent procedure. Maximum oversizing limit for heating systems is 15% (with the exception of heat pumps in Climate Zones 5 - 6, where the maximum oversizing limit is 25% of the cooling load if the heating load dictates higher equipment capacity). The following operating conditions shall be used in the sizing calculations and verified where reviewed by the rater:
  - i. Outdoor temperatures shall be the 99.0% design temperature as published in the ASHRAE Handbook of Fundamentals for the home's location or most representative city for which design temperature data are available;
  - ii. Indoor temperatures shall be 70°F for heating;
  - iii. Infiltration rate shall be selected as "tight", or the equivalent term.
- b. In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils shall be matched in accordance with ARI standards.
- c. Heating equipment shall be installed in accordance with manufacturer's specifications and meet the following efficiency standards:
  - i. Gas-fired furnaces shall be ENERGY STAR qualified a minimum efficiency of 90% AFUE.
  - ii. Gas-fired boilers shall be ENERGY STAR qualified a minimum efficiency of 85% AFUE. iii. Oil-fired equipment shall be a minimum efficiency of 85% AFUE.
- d. Combination hydro-air systems may be used provided that the system components utilized are ENERGY STAR qualified or meet the requirements as defined in a, b, and c above.
- e. Radiant heating systems when used shall be installed in accordance with industry accepted best practices and all applicable codes. Equipment utilized shall be ENERGY STAR qualified or meet the requirements as defined in a. above.
- f. The program recommends mechanically assisted (i.e. "power-vented") or sealed combustion heating equipment be used whenever possible.
- g. ENERGY STAR thermostats shall be installed except in zones with radiant heat.

## 8) **Air Conditioning and Heat Pumps:**

- a. Cooling equipment and heat pumps shall be sized according to the latest editions of ACCA Manuals J and S, or an equivalent procedure. Maximum oversizing limit for cooling systems and heat pumps is 15% (with the exception of heat pumps in Climate Zones 5 - 6, where the maximum oversizing limit is 25% of the cooling load if the heating load dictates higher equipment capacity). The following operating conditions shall be used in the sizing calculations and verified where reviewed by the rater:
  - i. Outdoor temperatures shall be the 1.0% 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;
  - ii. Indoor temperatures shall be 75°F for cooling;
  - iii. Infiltration rate shall be selected as "tight", or the equivalent term.

- b. In specifying equipment, the next available size may be used. In addition, indoor and outdoor coils shall be matched in accordance with ARI standards.
- c. Central air conditioning equipment and air source heat pumps shall be installed in accordance with manufacturer’s specifications. Airflow and refrigerant charge shall be tested and verified. Coil and air handler combinations shall be properly matched using the ARI-CEE Directory.
- d. Central air conditioners installed in the modified downstate service territory shall be ENERGY STAR and have a SEER rating of 14 or higher (and a minimum EER of 12). It is recommended that all CAC equipment installed in ENERGY STAR homes throughout New York State have a SEER rating of 14 or higher (and a minimum EER of 12).
- e. Ground Source Heat Pumps shall be ENERGY STAR labeled and installed in accordance with the manufacturer specifications.
- f. ENERGY STAR thermostats shall be installed except in zones with radiant heat.

**9) Domestic Hot Water Equipment:**

- a. Domestic hot water heater equipment (DHW) shall meet the following minimum Energy Factors (EF’s):

New York ENERGY STAR <sup>®</sup> Qualified Homes		
Minimum Energy Factor (EF) for Water Heaters		
Rated Storage Capacity	Minimum EF for Natural Gas or Propane Systems	Minimum EF for Electric Systems
30	0.63	0.94
40	0.61	0.93
50	0.59	0.92
75	0.54	0.90
100	0.49	0.87

Notes:

For gas-fired water heaters not tested for an Energy Factor (EF), contact a program representative for information on modeling assumptions

- b. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equations:
  - Gas DHW  $EF \geq 0.69 - (0.002 \times \text{Tank Gallon Capacity})$ ;
  - Electric DHW  $EF \geq 0.97 - (0.001 \times \text{Tank Gallon Capacity})$ .
- c. It is strongly recommended that homes with gas or oil hydronic space heating systems (i.e. a boiler) have an indirect-fired storage system or an instantaneous water heating system.
- d. The program recommends mechanically assisted (i.e. “power-vented”) or sealed combustion DHW equipment be used whenever possible.

**10) Duct Construction:**

- a. All air distribution and ventilation ducts be properly sized according to the latest editions of ACCA Manual D calculation procedures or an approved equivalent.
- b. All air distribution and ventilation ducts shall be sealed with mastic or other permanent sealants that are compliant with the UL\_181 standard so that the resulting system is tight:
  - i. When using a HERS rating, duct leakage shall not exceed 6 cfm to outdoors per 100 square feet of conditioned floor area.

- ii. When using the NYESLH BOP, duct leakage shall not exceed 4 cfm to outdoors per 100 square feet of conditioned floor area.

**NOTE:** 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.

- c. All heating and/or cooling ducts in unconditioned spaces shall be insulated as required by the New York State Energy Conservation Construction Code current edition.
- d. Duct system leakage shall be quantified by testing with a RESNET-approved method. Where a "total duct leakage" test is conducted that meets the guidelines in sections b.i. or b.ii., it shall be deemed to meet the requirements for "leakage to outdoors" provided boot-to-drywall connections are verified as sealed. For items b.i and b.ii, an accepted air flow cfm leakage to outdoors test shall be completed with results on file. To assure item iii can be waived, a whole house air leakage test (blower door) test shall be completed and results on file.