

2008/09 New York ENERGY STAR[®] Homes Technical Specifications

1) New York ENERGY STAR Homes:

All New York ENERGY STAR Homes shall meet the requirements set for EPA's ENERGY STAR Qualified Homes. Compliance shall be demonstrated by meeting the performance standards and the additional New York State requirements detailed in this document (i.e., a minimum expanded Home Energy Rating System ("HERS") Score of 84.0¹) or the New York ENERGY STAR Builder Option Package ("BOP").

a. The Final HERS Rating shall:

- i. Score an 84.0 or higher according to RESNET accredited rating software (e.g. REM/Rate or other software listed at www.resnet.us/programs/software/directory.htm.) that conforms to the current RESNET technical standards and has the capacity to report using the expanded HERS score format.
- ii. Accurately reflect the 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 and local codes.

3) Electrical kWh Savings:

- a. Electricity savings levels can be achieved by installing a mixture of compact fluorescent lamps, high efficiency lighting fixtures, efficient appliances, ceiling fans equipped with efficient lighting fixtures, furnace or air handler equipped with high efficiency variable speed or ECM motors and central air conditioning systems with a SEER of 15 or greater. Variable speed motors must be listed in manufacturers' specifications as "high efficiency" in order to qualify for the kWh credit listed in Table 1.
- b. All lighting, appliances, ceiling fans equipped with efficient lighting fixtures and ventilation fans shall be "ENERGY STAR[®]" Qualified.
- c. ENERGY STAR Qualified lighting fixtures or lamps, and compact fluorescent light bulbs (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).

¹ 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.

- d. Lighting, appliances, central air conditioning units and furnace or air handlers with high efficiency variable speed or ECM motors will be credited with kWh savings according to Table 1 as follows:

Table 1. NYESH Electrical Savings	
ENERGY STAR Qualified Lighting (including lighting in ceiling fans)	ENERGY STAR Lamps (screw-based CFL "bulbs") : 35 kWh each ²
	ENERGY STAR Fixtures : 50 kWh per lamp ³
ENERGY STAR Qualified Appliances ⁴	ENERGY STAR Refrigerator: 100 kWh each
	ENERGY STAR Freezer: 50 kWh each
	ENERGY STAR Dishwasher: 50 kWh each
	ENERGY STAR Clothes Washer: 75 kWh each
Mechanical	High efficiency variable speed or ECM Motors: 400 kWh per air handler
	Central AC 15 SEER or higher: 175 kWh

- e. The combination of appliances, lighting fixtures, CFLs, high efficiency variable speed or ECM motors and eligible central air conditioning units 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. These are summarized in Table 2 below:

Table 2. Requirements for Appliances, Lighting and High Efficiency Variable Speed or ECM Motors				
Tier	Expanded HERS Score	Appliances Provided by Builder?	kWh Requirement	Combination of ENERGY STAR appliances, lighting & high efficiency variable speed or ECM motors needed to meet kWh requirement
Tier 1	84.0-86.9 or BOP	Yes	500 kWh	1 ENERGY STAR Qualified Appliance AND Any combination of additional ENERGY STAR lighting high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement
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. AND Any combination of ENERGY STAR lighting, high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement.
Table 2, CONTINUED. Requirements for Appliances, Lighting and High Efficiency Variable Speed or ECM Motors				

² Compact fluorescent lamps that are easily identifiable as being screw based will be credited with 35kWh savings per lamp.

³ In instances where compact fluorescent lamps are not easily identifiable as either screw based or pin based due to their inaccessibility, it will be assumed that the compact fluorescent lamps are pin based and will be credited with 50 kWh savings for each lamp in the fixture.

⁴ The term ENERGY STAR Qualified Appliances does not include HVAC equipment as used for the purposes of this program.

Tier	Expanded HERS Score	Appliances Provided by Builder?	kWh Requirement	Combination of ENERGY STAR appliances, lighting & high efficiency variable speed or ECM motors needed to meet kWh requirement
Tier 2	87.0-88.9	Yes	500 kWh	1 ENERGY STAR Qualified Appliance AND Any combination of additional ENERGY STAR lighting high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement
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. AND Any combination of ENERGY STAR lighting, high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement.
Tier 3	89.0 or higher	Yes	500 kWh	2 ENERGY STAR Qualified appliances OR 1 ENERGY STAR Qualified appliance + 2 ENERGY STAR Qualified fixtures AND Any combination of additional ENERGY STAR lighting high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement
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. AND Any combination of ENERGY STAR lighting, high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement.
Display	Any Tier	Yes (required)	650 kWh	2 ENERGY STAR Qualified appliances OR 1 ENERGY STAR Qualified appliance + 2 ENERGY STAR Qualified fixtures AND
Model	Any Tier	Yes (required)	650 kWh	Any combination of additional ENERGY STAR lighting high efficiency variable speed or ECM motors and eligible central air conditioning units may be used to meet this requirement

4) Tight Homes:

- a. All homes submitted through the NYESH Program shall have 5 or less Air Changes per hour measured at a pressure difference of 50 Pascals (ACH₅₀).
- b. An “ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist” shall be completed for all homes submitted through the NYESH Program.
- c. Whenever possible, program participants shall employ a blower door to conduct air leakage diagnostics to identify air leaks and help guide air sealing work to achieve 5ACH₅₀ or less.

5) Mechanical Ventilation:

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

Table 3. New York ENERGY STAR® Homes 2008 Minimum Ventilation Requirement⁵ (CFM)								
House Square Footage		<-----Number of Bedrooms----->						
		1	2	3	4	5	6	7
	1000	25	33	40	48	55	63	70
1001	1500	30	38	45	53	60	68	75
1501	2000	35	43	50	58	65	73	80
2001	2500	40	48	55	63	70	78	85
2501	3000	45	53	60	68	75	83	90
3001	3500	50	58	65	73	80	88	95
3501	4000	55	63	70	78	85	93	100
4001	4500	60	68	75	83	90	98	105
4501	5000	65	73	80	88	95	103	110
5001	5500	70	78	85	93	100	108	115
5501	6000	75	83	90	98	105	113	120

- b. For homes with exhaust only whole house mechanical ventilation systems, ventilation fans shall be ENERGY STAR® qualified (energy recovery ventilators and remote/in-line fans are exempt).
- c. The ventilation system shall be installed to operate automatically without occupant intervention and exhaust to the exterior of the building. However, a readily accessible override control shall be provided to the occupant. Examples of commonly available controls are provided in the sample ventilation fact sheet.

6) Insulation Installation:

- a. Insulation shall be installed to meet 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.
- 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 and wind washing.

⁵ Table 3 above is from ASHRAE 62.2. Higher levels of ventilation are allowed where it is determined to be best practice. However, these higher ventilation levels may negatively impact the expanded HERS score.

7) **Heating:**

- a. Heating equipment shall be sized in accordance with Section M1401.3 of the *Residential Code* of New York State.
- b. In specifying equipment, the next largest available capacity unit may be used. For example: if the Manual J calculates a load of 103,000 Btu and the next largest available unit is 112,000 Btu, then the largest allowed unit would be the 112,000 Btu unit. In addition, for air source heat pumps 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 meet or exceed the ENERGY STAR minimum efficiency of 90% AFUE.
 - ii. Gas-fired boilers shall meet or exceed the ENERGY STAR minimum efficiency of 85% AFUE. Oil-fired equipment shall be a minimum efficiency of 85% AFUE.
- d. Combination Space Heating and Water Heating Appliances must have a Combined Annual Efficiency (CAE) GAMA rating of .73 or higher.
- e. Domestic water heaters that are used for domestic water heating and space heating but do NOT have a CAE rating must meet the program energy factor guidelines detailed in section 9.a of this document; and have a recovery efficiency of 85% or higher; and be approved by the manufacturer as a unit capable of providing space heating and domestic hot water.
- f. Combination hydro-air systems may be used provided that the system components utilized are ENERGY STAR qualified or meet all applicable requirements as defined in Section 7 and incorporate a high efficiency variable speed or ECM fan motor for the circulation of conditioned air.
- g. Radiant heating systems when used shall be installed in accordance with industry accepted best practices and all applicable codes. System components utilized must be ENERGY STAR qualified or meet all applicable requirements as defined in section 7.
- h. The Program recommends the use of mechanically assisted (i.e. "power-vented") or sealed combustion heating equipment.
- i. ENERGY STAR thermostats shall be installed except in zones with radiant heat.
- j. In cases where more than one heating system is installed, all heating equipment must meet the Program efficiency standards.
- k. Combustion safety testing and gas leak detection testing must be conducted on each New York ENERGY STAR Home. Please refer to Appendix A Combustion Safety Testing for New York ENERGY STAR Homes.

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

- a. Cooling equipment shall be sized in accordance with Section M1401.3 of the *Residential Code* of New York State.
- b. In specifying equipment, the next largest available capacity unit may be used. For example: if the Manual J calculates a load of 32,000 Btu and the next largest available unit is 36,000 Btu, then the largest allowed unit would be the 36,000 Btu unit. In addition, for air source heat pumps 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. 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). Outside of the modified downstate territory, it is recommended that CAC equipment

installed in New York ENERGY STAR homes have a minimum SEER rating of 14 (and a minimum of EER 12).

- e. Ground Source Heat Pumps shall be installed in accordance with the manufacturer’s specifications and meet the US EPA “Full Eligibility Criteria” which can be found at http://www.energystar.gov/index.cfm?c=geo_heat.pr_geo_heat_pumps.
- f. ENERGY STAR thermostats shall be installed except in zones with radiant heat.
- g. If more than one unit is installed, all cooling equipment must meet the Program efficiency standards.
- h. Central air conditioning equipment shall be tested to meet the Building Performance Institute (BPI) Technical Standards for Air Conditioning and Heat Pump Specialist, Section 2.6.1. The required standard can be found on page 11 of 18 at the website link http://www.bpi.org/documents/AC_HP_Final.pdf. It is not required that a BPI-accredited firm performs the tests defined in the BPI Technical Standards. However, NYSERDA is recommending the use of BPI-accredited firms for applicable work and offering supporting incentives to builders who consent. See number 5 of the “NYSERDA’s Commitment” section in the “2008/09 Addendum to the ENERGY STAR Partnership Agreement: New York ENERGY STAR Homes” for details.

9) Domestic Hot Water Equipment:

Domestic hot water heaters shall be sized according to the guidelines established by the Gas Appliance Manufacturer’s Association (GAMA). The first hour rating for new systems shall match the calculated peak hour demand within 1-2 gallons.

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

Table 4. New York ENERGY STAR® Homes Minimum Energy Factors (EFs) for Water Heaters		
Rated Storage Capacity	Minimum EF for Natural Gas or Propane Water Heaters	Minimum EF for Electric Water Heaters
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. The Program strongly recommends that homes with gas or oil hydronic space heating systems (i.e. a boiler) have an indirect-fired storage tank or an on demand water heating

appliance.

- d. The Program recommends mechanically assisted (i.e. “power-vented”) or sealed combustion DHW equipment be used.
- e. For water heaters with no rated Energy Factor (EF), contact a program representative for information on modeling assumptions.
- f. In situations where multiple DHW tanks are use to provide additional capacity; each individual tank in the system must meet the Program technical specification for that size. For example two 40 gallon gas-fired water heaters piped in tandem (for a total capacity of 80 gallons) must each have an EF of at least .61.
- g. Oil-fired water heaters do not have a minimum EF requirement but must have a flame retention burner.

10) Duct Construction:

- a. All air distribution ducts shall be sized and installed in accordance with Section M1601 and M1602 of the *Residential Code* of New York State. Information can be found at: <http://ecodes.iccsafe.org/iccf/gateway.dll?f=templates&fn=default.htm&vid=icc:ny>
- b. Also:
 - 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 NYESH BOP, duct leakage shall not exceed 4 cfm to outdoors per 100 square feet of conditioned floor area.
 - iii. 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 ≤ 3 ACH50.
- c. Duct system leakage shall be quantified by testing according to 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 item 10.b.i., an accepted air flow cfm leakage to outdoors test shall be completed with results maintained on file. To assure item 10.b.iii.can be waived, a whole house air leakage test (blower door test) shall be completed and results maintained on file.
- d. All air ventilation ducts shall be sized and installed in accordance with Section M1506 of the *Residential Code* of New York State. Information can be found at: