MULTIFAMILY PERFORMANCE PROGRAM

NEW CONSTRUCTION COMPONENT

Prescriptive Path Requirements

Version 4.1 ***December 2010***

Purpose:

This Prescriptive Path document establishes the requirements necessary to earn the ENERGY STAR using this prescriptive approach. In addition to meeting all requirements listed in this document, a building must also meet all NYSERDA requirements as detailed in the *Program Guidelines* Section 3.

COMPONENT	PRESCRIPTIVE REQUIREMENTS **The proposed design shall AT LEAST meet all Minimum Performance Standards and all requirements listed below.**
Domestic Water Heating	▪ Domestic hot water systems must comply with ASHRAE Standard 90.1-2007 Section 7.5. ▪ Water Heater minimum efficiencies:[1] - In-Unit Electric OR Gas Water Heaters (storage or instantaneous) Gas (EF): 0.69-(0.002 x Tank Gallon Capacity) Electric (EF): 0.97-(0.001 x Tank Gallon Capacity) - Hot Water Supply Boiler: Oil or Gas: 85% Et ▪ Common area and in-unit showerheads must not exceed 1.75 gpm per shower stall. ▪ Common area and in-unit lavatory faucets must not exceed 1.50 gpm.
Envelope	▪ Maximum allowable glazing area: 30% Window-to-Wall Ratio.[2] ▪ See Table 1 for climate specific envelope requirements for the following components: roof insulation; above grade and below grade wall insulation; floor and slab insulation; exterior doors; and vertical glazing.[3]
Garages and Sidewalks	▪ When garage exhaust is required by code, CO sensors must be installed that control exhaust fan operation.
Heating and Cooling Equipment	▪ Heating and cooling systems must comply with ASHRAE Standard 90.1-2007 Section 6.5. ▪ See Table 2 for list of equipment and minimum efficiencies per ASHRAE 90.1–2007 Climate Zones[3]. Part-load minimum efficiencies listed are only applicable to equipment with capacity modulation. See ASHRAE 189.1-2009 Appendix C for equipment not listed.
Heating and Cooling Distribution	▪ Heating and cooling supply and return ductwork shall be insulated to a minimum R-8 in unconditioned space.
Lighting	Occupancy Controls ▪ Automatic controls must be specified for spaces intended for 24-hour operation such as corridors and stairwells.
	Common Area Lighting ▪ Total specified lighting power for the combined non-apartment spaces must not exceed ASHRAE 90.1-2007 allowances for those combined spaces.
	In-Unit Lighting ▪ Overall in-unit lighting power density may not exceed 0.7 W/ft^2. When calculating overall lighting power density, use 0.7 W/ft^2 for spaces where lighting is not installed. ▪ For spaces where installed light fixtures do not meet illumination requirements and occupants are expected to provide supplemental lighting (e.g. bedrooms), assume the installed light fixture can illuminate at most 2 ft^2 per Watt installed.
	Exterior Lighting ▪ Total specified exterior lighting power cannot exceed ASHRAE 90.1-2007 allowances. Trade-offs are only allowed as specified in ASHRAE 90.1-2007 Table 9.4.5.

<table>
<tr><th>COMPONENT</th><th>PRESCRIPTIVE REQUIREMENTS
The proposed design shall AT LEAST meet all Minimum Performance Standards and all requirements listed below.</th></tr>
<tr><td rowspan="5">Ventilation and Infiltration</td><td>▪ Central exhaust and in-line exhaust systems serving apartments must have self-balancing dampers at each grille.
▪ Central exhaust fans 1/16 HP and less must be direct-drive and have variable speed controllers.
▪ Central exhaust fans greater than 1/16 HP and less than 1 HP must be direct-drive with ECM motors and variable speed controllers.
▪ Central exhaust fans 1 HP and larger must have NEMA Premium efficient motors.
▪ In addition to requirements above, powered common laundry ventilation must be installed with automatic demand control to turn off ventilation fans when no dryers are operating.</td></tr>
<tr><td>Central exhaust duct leakage not to exceed 5 CFM50 per floor per grille during testing.</td></tr>
<tr><td>Design/Measured Ventilation Rates for Common Area[4]</td><td>Minimum
ASHRAE 62.1-2007</td><td>Maximum
not to exceed ASHRAE 62.1 by more than 50%</td></tr>
<tr><td>Design/Measured Ventilation Rates for In-Unit (whole bldg & exhaust)[5]</td><td>Minimum
ASHRAE 62.2-2007</td><td>Maximum
not to exceed ASHRAE 62.2 by more than 50%</td></tr>
<tr><td>Motor Efficiency</td><td>▪ Motors 5 horse-power or larger in circulating pumps serving hydronic heating or cooling systems must be specified with variable frequency drives.</td></tr>
</table>

Footnotes

1. See ASHRAE 189.1-2009 Appendix C for equipment not listed. The minimum efficiency for instantaneous water heaters shall be determined assuming 1 gallon tank capacity.
2. Window-to-Wall ratio is taken as the sum of all window area divided by the total exterior above-grade wall area. All decorative glass and skylight window area contribute to the total window area to above-grade wall ratio (WWR).
3. The appropriate climate zone for each building site shall be determined by ASHRAE 90.1–2007, Table B-1. Envelope requirements are based on ASHRAE 189.1-2009, Appendix A.
4. Common area ventilation systems shall be designed and tested to satisfy minimum requirements of ASHRAE 62.1-2007, without exceeding recommended rates by more than 50%.
5. Apartment ventilation systems shall be designed and tested to satisfy minimum requirements of ASHRAE 62.2-2007 based upon the anticipated occupancy, without reliance on natural ventilation and without exceeding ASHRAE 62.2-2007 by more than 50%. Compliance with ASHRAE 62.2-2007 Sections 4.3 and 5.3.1 is recommended, but not required. Design and tested exhaust rates shall not exceed the minimum exhaust rates specified in Table 5.1 and 5.2 of ASHRAE 62.2-2007 by more than 50%. Therefore, the maximum continuous exhaust rates in kitchens is 7.5 ACH and in bathrooms 30 CFM. The maximum intermittent exhaust rates in kitchens are 150 CFM and in bathrooms 75 CFM.

Table 1: Climate Specific Envelope Requirements for Climate Zones 4, 5 and 6

	Nominal R Value (Minimum)	Assembly U-Value (Maximum)	Nominal R Value (Minimum)	Assembly U-Value (Maximum)	Nominal R Value (Minimum)	Assembly U-Value (Maximum)
	Climate Zone 4		Climate Zone 5		Climate Zone 6	
Roof Insulation						
Insulation entirely above deck	R-25.0 ci	U-0.039	R-25.0 ci	U-0.039	R-30.0 ci	U-0.032
Metal Building	R-19.0 + R-11.0 LS	U-0.035	R-19.0 + R-11.0 Ls	U-0.035	R-25.0 + R-11.0 Ls	U-0.031
Attic and Other	R-49.0	U-0.021	R-49.0	U-0.021	R-49.0	U-0.021
Above Grade Wall						
Mass	R-13.3 ci	U-0.080	R-15.2 ci	U-0.071	R-20.0 ci	U-0.060
Metal Building	R-13.0 + R-13.0 ci	U-0.052	R-13.0 + R-13.0 ci	U-0.052	R-13.0 + R-13.0 ci	U-0.052
Steel-Framed	R-13.0 + R-10.0 ci	U-0.055	R-13.0 + R-10.0 ci	U-0.055	R-13.0 + R-10.0 ci	U-0.055
Wood-framed and other	R-13.0 + R-7.5 ci	U-0.051	R-13.0 + R-10.0 ci	U-0.045	R-13.0 + R-10.0 ci	U-0.045
Below Grade Wall Insulation						
Conditioned and Indirectly Conditioned space	R-10.0 ci	C-0.092	R-10.0 ci	C-0.092	R-10.0 ci	C-0.092
Unconditioned space	NR		NR		NR	
Floor Insulation						
Mass	R-12.5 ci	U-0.064	R-14.6 ci	U-0.057	R-16.7 ci	U-0.051
Steel-Joist	R-38.0	U-0.032	R-38.0	U-0.032	R-38.0 + R-12.5 ci	U-0.023
Wood-framed and other	R-30.0 + R-7.5 ci	U-0.026	R-30.0 + R-7.5 ci	U-0.026	R-30.0 + R-7.5 ci	U-0.026
Slab Insulation						
Unheated (non-radiant) and on-grade	R-15.0 for 24 in.		R-15.0 for 24 in.		R-20.0 for 24 in.	
Heated (radiant)	R-10.0 for 24 in. + R-5 ci below		R-15.0 for 36 in. + R-5 ci below		R-15.0 for 36 in. + R-5 ci below	
Exterior Doors						
Opaque - All	--	U-0.6	--	U-0.4	--	U-0.4
Vertical Glazing						
Nonmetal framing	ENERGY STAR		ENERGY STAR		ENERGY STAR	
	Assembly Max. U	Assembly Max. SHGC	Assembly Max. U	Assembly Max. SHGC	Assembly Max. U	Assembly Max. SHGC
Metal framing (curtain wall/ storefront)	U-0.40	SHGC-0.40	U-0.35	SHGC-0.40	U-0.35	SHGC-0.40
Metal framing (entrance door)	U-0.75		U-0.70		U-0.70	
Metal framing (all other)	U-0.45		U-0.45		U-0.45	

Definitions: ci = continuous insulation; Ls = linear system; NR = no insulation requirement.

Table 2: ENERGY STAR MFHR Prescriptive Path – Minimum Heating and Cooling Equipment Efficiencies

Equipment Type	Minimum Efficiency per ASHRAE 90.1 2007 Climate Zones		
	CZ 4	CZ 5	CZ 6
Room AC (window, through-wall, ductless, mini-splits)	ENERGY STAR qualified		
Air conditioners, air cooled (<13 KBtu/h)	13 SEER		
Air conditioners, air cooled (≥13 and <65 KBtu/h)	ENERGY STAR qualified		
Air conditioners, air cooled (≥65 and <240 KBtu/h)	11.5 EER/12.0 IEER		
Air conditioners, air cooled (≥240 and <760 KBtu/h)	10.0 EER/10.5 IEER		
Electric resistance space heating	Not permitted in any space using this approach		
Warm air furnace (<225 KBtu/h, common areas)	78% AFUE or 80% Et		
Warm air furnace (<225 KBtu/h, apartments)	ENERGY STAR		95% AFUE (gas) or 90% AFUE (oil)
Warm air furnace (>225 KBtu/h)	80% Et (gas) / 81% Et (oil)		
Packaged terminal air conditioner (PTAC)*	13.8 – (0.300 X Cap/1000) EER		
Packaged terminal heat pump (PTHP)*	Cooling: 14.0 – (0.3 X Cap/1000) EER Heating: 3.7 – (0.052 X Cap/1000) COP		
Air cooled heat pump (≥13 and <65 KBtu/h)	ENERGY STAR qualified w/ dual-fuel backup		
Air cooled heat pump (≥65 and <240 KBtu/h)	Cooling: 11.1 EER/11.6 IEER Heating: 3.3 COP (@47°F DB)		
Air cooled heat pump (≥240 KBtu/h)	Cooling: 9.6 EER/9.6 IEER Heating: 3.2 COP (@47°F DB)		
Water source heat pump (<135 KBtu/h)	Cooling: 14.0 EER (86°F entering water) Heating: 4.2 COP (68°F entering water)		
Boilers, hot water (<300,000 Btu/h)	85% AFUE		
Boilers, hot water (≥300,000 Btu/hr)	87% Et (89% if using heat pumps)		
VRF Air Conditioners and Heat Pumps	See Tables 6.8.1I and 6.8.1J of ASHRAE 90.1-2010		
Air-cooled chiller with or without condenser	10.0 EER (full load) / 12.5 EER (IPLV)		
Water-cooled chiller, positive displacement (<75 tons)	0.780 kW/ton (full load) / 0.630 kW/ton (IPLV)		
Water-cooled chiller, positive displacement (75-150 tons)	0.775 kW/ton (full load) / 0.615 kW/ton (IPLV)		
Water-cooled chiller, positive displacement (150-300 tons)	0.680 kW/ton (full load) / 0.580 kW/ton (IPLV)		
Water-cooled chiller, positive displacement (>300 tons)	0.620 kW/ton (full load) / 0.540 kW/ton (IPLV)		
Water-cooled chiller, centrifugal (<300 tons)	0.634 kW/ton (full load) / 0.596 kW/ton (IPLV)		
Water-cooled chiller, centrifugal (≥300 tons and <600 tons)	0.576 kW/ton (full load) / 0.549 kW/ton (IPLV)		
Water-cooled chiller, centrifugal (≥600 tons)	0.570 kW/ton (full load) / 0.539 kW/ton (IPLV)		
Air-cooled absorption single effect chiller	0.60 COP		
Water-cooled absorption single effect chiller	0.70 COP		
Absorption double effect indirect-fired chiller	1.00 COP (full load)/ 1.05 COP (IPLV)		
Absorption double effect direct-fired chiller	1.00 COP (full load) / 1.00 COP (IPLV)		
Open-loop propeller or axial fan cooling towers**	>40 gpm/hp (@95°F entering water, 85°F leaving water, 75°F wb entering air)		
Closed-loop propeller or axial fan cooling towers**	>15 gpm/hp (@102°F entering water, 90°F leaving water, 75°F wb entering air)		
Open-loop centrifugal fan cooling towers**	>22 gpm/hp (@95°F entering water, 85°F leaving water, 75°F wb entering air)		
Closed-loop centrifugal fan cooling towers**	>8 gpm/hp (@102°F entering water, 90°F leaving water, 75°F wb entering air)		

*Cap=Rated capacity of the product (Btu/h). If <7,000 Btu/h, use 7,000; if >15,000 Btu/h, use 15,000.
**Cooling tower fan motors must be equipped with VFD controlled by a temperature sensor on the condenser water supply pipe.