DOE Efficient New Homes Multifamily ERI Target Procedure Version 2 (Rev. 2)

National ERI Target Procedure for use with ANSI/RESNET/ICC 301

This document provides detailed instructions for determining the DOE Efficient New Homes ERI Target – the highest ERI value that each rated multifamily dwelling unit (excluding townhouses) may achieve to earn the DOE Efficient New Homes Multifamily Program Version 2 Certification. In addition to meeting the ERI Target for each unit, units shall also meet all mandatory requirements in Exhibit 1 of the DOE Efficient New Homes Multifamily Version 2 National Program Requirements. While Townhouses permitted before 1/1/2026 are eligible to earn DOE Efficient New Homes certification under the Multifamily Version 2 program, they must meet the ERI Target score established by the by DOE Efficient New Homes Single Family Version 2 ERI Target procedure.

A recognized Home Certification Organization for DOE Efficient New Homes (HCO for DOE) Approved Software Rating Tool shall automatically determine (i.e., without relying on a user-configured DOE Efficient New Homes Multifamily Reference Design) this target for each rated unit. This software is reviewed and approved by DOE. The target is created by configuring the DOE Efficient New Homes Multifamily Version 2 Reference Design in accordance with Exhibit 1, below, and calculating its associated ERI value. The ERI value shall be calculated using ANSI/RESNET/ICC Standard 301 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the implementation schedule defined by the HCO for DOE that the building is being certified under, with approved exceptions listed here. This ERI value, rounded to the nearest whole number, shall equal the DOE Efficient New Homes Multifamily Version 2 ERI Target.

On-site power generation in the Design Dwelling may not be used to meet the DOE Efficient New Homes Multifamily Version 2 ERI target.

Exhibit 1: Expanded DOE Efficient New Homes Multifamily Reference Design Definition [1]

Foundations								
Construction Type and Structural Mass	Same as Rated Unit,[2] except for masonry floor slabs, which are modeled with 80% of floor area covered by carpet and 20% of floor directly exposed to room air.							
Conditioning Type	Same as Rated Unit, except for crawlspaces , which are modeled as vented with net free vent aperture = 1 ft^2 per 150 ft^2 of crawlspace floor area.							
Gross Area	Same as Rated Unit							
Insulation [3, 4]	Insulation level based on climate zone (below)							
Climate Zone (CZ):[5]	**1**	**2**	**3**	**4**	**4C, 5**	**6**	**7**	**8**
Slab Insulation R-Value:	0	0	10	10	10	10	10	10
Slab Insulation Depth (ft):	0	0	2	4	4	4	4	4
Basement Wall Assembly U-factor:	0.360	0.360	0.091	0.059	0.050	0.050	0.050	0.050

- Basement wall continuous insulation R-value only applies to conditioned basements; if applicable, insulation shall be located on interior side of walls
- Floor assemblies above crawlspace foundations shall be configured to meet the applicable floor assembly U-factor listed in the building component section for floors over unconditioned spaces and crawlspace walls shall be uninsulated.
- Slab floors with a floor surface less than 24” below grade shall be insulated to the slab insulation R-value. The insulation shall extend downward from the top of the slab on the outside of the foundation walls and then vertically below-grade to the slab insulation depth.[6]

Floors Over Unconditioned Space Volume, Non-Freezing Space, Unrated Heated Space, Multifamily Buffer Boundary, or over outdoor environment	
Construction type	Same as Rated Unit

Gross Area	Same as Rated Unit							
Insulation	Insulation level based on climate zone (below)							
Climate Zone:	**1**	**2**	**3**	**4**	**4C, 5**	**6**	**7**	**8**
Jost/Framing Floor U-factor:	0.064	0.064	0.047	0.047	0.033	0.033	0.028	0.028
Mass Floor U-Factor:	0.322	0.087	0.074	0.051	0.051	0.051	0.042	0.038
Above-Grade Walls, adjacent to Exterior or Garage								
Interior and Exterior Construction Type	Wood frame							
Gross Area	Same as Rated Unit							
Solar Absorptance	0.75							
Emittance	0.90							
Insulation	Grade I installation, insulation level based on climate zone (below)							
Climate Zone:	**1**	**2**	**3**	**4**	**4C, 5**	**6**	**7**	**8**
Wall Assembly U-Factor:	0.084	0.084	0.060	0.045	0.045	0.045	0.045	0.045
Thermally Isolated Sunrooms								
None								
Doors								
Area	Same as Rated Unit, with door seal properly installed to minimize air leakage between the door and door frame, to avoid the 140 CFM50 addition to measured airflow per ANSI/RESNET/ICC Standard 380.							
Orientation	Same as Rated Unit							
Door Type [7]	Same as Rated Unit, U/SHGC based on type and climate zone (below)							
Door Type:	Opaque	≤ ½-Lite	> ½-Lite (CZ 1-3)	> ½-Lite (CZ 4-8)				
Whole Door U-Factor:	0.17	0.25	0.30	0.30				
SHGC:	n/a	0.25	0.25	0.40				
Glazing								
Total Area	AG = 0.15 x CFA x FA x F, without exceeding available wall area.[8]							
Orientation	Same as Rated Unit, by percentage of area							
Interior Shade Coefficient	Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301							
External Shading	None							
Skylights	None							
Climate Zone:	**1**	**2**	**3**	**4**	**4C, 5**	**6**	**7**	**8**
Non-Class AW Window U-Factor:	0.40	0.40	0.30	0.30	0.27	0.25	0.25	0.25
Non-Class AW Window SHGC:	0.23	0.23	0.25	0.30	0.30	0.30	0.30	0.30
Class AW Fixed Window U-Factor:	0.48	0.43	0.40	0.34	0.34	0.32	0.28	0.27
Class AW Operable Window U-Factor:	0.59	0.57	0.51	0.43	0.43	0.40	0.34	0.30
Class AW SHGC:	0.25	0.25	0.25	0.30	0.30	0.30	0.30	0.30
Ceilings, adjacent to Exterior or Unconditioned Space Volumes								
Construction Type	Wood frame							
Gross Area	Same as Rated Unit							
Insulation	Grade I installation, insulation level based on climate zone (below)							

Climate Zone:	1	2	3	4	4C, 5	6	7	8
Ceiling Assembly U-Factor:	0.035	0.026	0.026	0.024	0.024	0.024	0.024	0.024

Attics	
Construction Type	Vented with aperture = 1 ft^2 per 300 ft^2 ceiling area[9]
Radiant Barrier	None
Roofs	
Construction Type	Composition shingle on wood sheathing
Gross Area	Same as Rated Unit
Solar Absorptance	0.92
Emittance	0.90
Internal Mass	
Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301.	
Additional mass specifically designed as a Thermal Storage Element for the Rated Unit shall be excluded	
Lighting, Appliances, Fixtures, and Internal Gains	
Lighting	Fraction of qualifying Tier II fixtures to all fixtures in qualifying light fixture locations 100% for interior; 100% for exterior and garage
Refrigerator	If present in Rated Dwelling Unit, annual energy use based on number of bedrooms: • 1-2 bedrooms: 450 kWh per year • 3-4 bedrooms: 600 kWh per year • 5 or more bedrooms: 650 kWh per year If no refrigerator present in Rated Home, annual energy use same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301: 637 + 18*(number of bedrooms).
Dishwasher Capacity	Same as Rated Unit, or Standard capacity if no dishwasher in installed in Rated Unit. For Standard capacity: LER = 270, GHWC = $22.23, Elec = $0.12, Gas = $1.09, LCY = 208 For Compact capacity: LER = 203, GHWC = $14.20, Elec = $0.12, Gas = $1.09, LCY = 208
Ceiling Fan	122 CFM per Watt, Quantity = Same as Rated Unit per ANSI/RESNET/ICC 301, either 0 or Number of bedrooms + 1
Clothes Washer	If the Rated Unit includes a clothes washer, then the clothes washer in the Target Dwelling is “Std 2018-Present" If the Rated Unit does not include a washer, then the clothes washer in the Target Home is the same as the Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301.
Clothes Dryer	Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301
Water fixtures	All showers and faucets ≤ 2.0 gpm
Internal Gains:	Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301, except for adjustments for the lighting, refrigerator, dishwasher, clothes washer, and ceiling fans specified in this section
Heating Systems	
Heating capacity shall be selected in accordance with ACCA Manual S based on loads calculated for the Reference Design in accordance with ACCA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, degraded capacity from other-than-Grade I installation shall be accounted for using same methodology applied to Energy Rating Reference Home.	

Where heat from a central boiler is distributed by water-loop heat pumps within the Rated Unit, in accordance with the methodology for the Rated Home in ANSI/RESNET/ICC Standard 301, the Reference Design shall be configured such that the heating load is assigned to two separate heating systems: 1) a heat pump with a capacity that is equal to the Reference Design heating load divided by 4.5 COP and 2) a boiler with the balance of the capacity of (1-1/4.5) or 77.78%

Fuel Type [10]	Same as Rated Unit, except Reference Design shall be configured with gas where Rated Unit has non-electric equipment
Installation Quality	For forced-air HVAC systems, Grade I total duct leakage[11], Grade I (-7.5%) blower fan airflow deviation, Grade I (0.45 W/CFM) blower fan efficiency, and for air-source heat pumps, Grade III refrigerant undercharge
System Type	Same as Rated Unit, except Reference Design shall be configured with air-source heat pump where Rated Unit has electric strip heat or electric baseboard heat; efficiency selected from below based on climate zone:[12]

Climate Zone:	1	2	3	4	4C, 5	6	7	8
Gas Furnace AFUE:	90	90	90	95	95	95	95	95
Gas Boiler AFUE:	90	90	90	95	95	95	95	95
Central Boiler, ≥ 300 KBtu/h E_t:	80	80	80	86	95	95	95	95
Central Boiler w/WLHP, ≥ 300 KBtu/h E_t:	80	80	80	89	90	90	90	90
Air-Source Heat Pump HSPF:	9.2	9.2	9.2	9.2	9.5	9.5	9.5	9.5
Air-Source Heat Pump Backup:	Electric							
Ground-Source Heat Pump COP:	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8

For non-electric warm air furnaces and non-electric boilers, serving the Rated Unit and no other units, the Electric Auxiliary Energy shall be determined in accordance with the methodology for the Energy Rating Reference Home in ANSI/RESNET/ICC Standard 301. For non-electric boilers and GSHPs, serving the Rated Unit and other units through a shared circulation loop, the Electric Auxiliary Energy shall be determined in accordance with the methodology for the Rated Home in the ANSI/RESNET/ICC Standard 301, using the same Shared Pump Power (SP_{kW}) OR using 0.85 for motor efficiency and using the same HP as the pump serving the Rated Unit

Cooling Systems[13]

Cooling capacity shall be selected in accordance with ACCA Manual S based on loads calculated for the Reference Design in accordance with ACCA Manual J, Eighth Edition, ASHRAE Handbook of Fundamentals, or an equivalent computation procedure. For forced-air HVAC systems, degraded capacity from Grade III install shall be accounted for using same methodology applied to Energy Rating Reference Home.

Fuel Type	Same as Rated Unit, except Reference Design shall be configured with gas where Rated Unit has non-electric equipment
Installation Quality	For forced-air HVAC systems, Grade I total duct leakage[11], Grade I (-7.5%) blower fan airflow deviation, Grade I (0.45 W/CFM) blower fan efficiency and, for A/Cs and air-source heat pumps, Grade III refrigerant undercharge
System Type	Same as Rated Unit, except Reference Design shall be configured with air-source heat pump where Rated Unit has electric strip heat, or electric baseboard heat; applicable efficiency selected from below based on climate zone:

Climate Zone:	1	2	3	4	4C, 5	6	7	8
AC SEER:	18	18	16	16	14	14	14	14
Air-Source Heat Pump SEER:	18	18	16	16	16	16	16	16

Ground-Source Heat Pump EER:	16	16	14	14	14	14	14	14
Where system type is a chiller or cooling tower with water-loop heat pumps, Reference Design $SEER_{eq}$ shall be determined in accordance with the methodology for the Rated Home in ANSI/RESNET/ICC Standard 301, using the same pumping and fan power OR using 0.85 for motor efficiency and using the same HP as the pumps and fans serving the Rated Unit. For chillers, Reference Design $SEER_{eq}$ shall be determined using 0.75 kW/ton. For water-loop heat pumps, Reference Design $SEER_{eq}$ shall be determined using 15 EER								
Whole-House Fan	None. Per ANSI/RESNET/ICC 301, a Whole-House Fan is a forced air system that exhausts at least 5 ACH of indoor air to the outdoors thereby drawing outdoor air into a home through open windows and doors for the purpose of cooling the home.							
Service Water Heating Systems								
Domestic hot water service piping insulation	Hot water distribution piping that serves multiple dwelling units (including all central systems) insulated to R-3. Hot water distribution piping associated with water heaters serving only one dwelling unit insulated to R-0.							
Use (Gallons per Day)	Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301, except for reduced usage resulting from the dishwasher, low-flow fixtures, and clothes washer as specified in the Lighting, Appliances, Fixtures, and Internal Gains Section							
Tank Temperature	Same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC Standard 301							
Recirculation Pump Energy	For pumps serving the Rated Unit and no other units: 0 kWh per year							
	For pumps serving the Rated Unit and other units: as defined by ANSI/RESNET/ICC Standard 301, using the same Shared HW Pump Power ($SHWP_{kW}$) OR using 0.85 for motor efficiency and using the same HP as the pump serving the Rated Unit							
Fuel Type	Same as Rated Unit except Reference Design shall be configured with gas where Rated Unit has non-electric equipment							
System Type	When Rated Unit is served by a commercial system: Same as system serving the Rated Unit, with no solar heating. For fossil-fuel boilers or water heaters, use 95% E_t. For electric boilers or water heaters, use 1.6 COP.							
	When Rated Unit is served by residential systems: Conventional storage water heater with no solar heating. Where Rated Unit has non-electric water heater, Reference Design shall be configured with a tankless gas water heater with 0.95 UEF. Where Rated Unit has electric water heater, Reference Design shall be configured with an electric heat pump water heater with 1.95 UEF and tank size equal to that of Rated Unit, or 60 gallon tank size if Rated Unit uses tankless electric water heater, and first hour rating (FHR) shall be equal to the Rated Home or 63 if the Rated Home does not specify FHR.							
Thermal Distribution Systems								
Duct Leakage to Outside	0 CFM25 per 100 ft^2 of conditioned floor area							
Duct Insulation	None							
Duct Surface Area	Same as Rated Unit							

Supply and Return Duct Locations	100% in conditioned space							
Dehumidifiers								
Type, capacity, and dehumidistat setpoint same as Energy Rating Reference Home, as defined by ANSI/RESNET/ICC 301, when dehumidification system is present in Rated Unit; otherwise, none.								
On-site Power Production								
None.								
On-site Energy Storage Systems								
None.								
Thermostat								
Type	Programmable							
Temperature Setpoints	Same as Energy Rating Reference Home, but with offsets for a programmable thermostat, as defined by ANSI/RESNET/ICC Standard 301							
Infiltration and Mechanical Ventilation								
Infiltration Rate	0.25 CFM50/ft^2 of enclosure area with A_{ext} applied to calculate Infiltration Rate, in accordance with ANSI / RESNET / ICC 301							
Mechanical ventilation system rate	CFM = 0.01 x CFA + 7.5 x (Nbr + 1), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms							
Mechanical ventilation system runtime	24 Hours/Day							
Mechanical ventilation system fan wats	Watts = CFM Rate/Ventilation Efficacy, where CFM Rate is determined above and Ventilation Efficacy is determined based on climate zone (below)							
Climate Zone:	**1**	**2**	**3**	**4**	**4c, 5**	**6**	**7**	**8**
Ventilation Efficacy (cfm/W):	2.9	2.9	2.9	2.9	1.2	1.2	1.2	1.2
Ventilation Type & Heat Recovery:	Supply				Balanced, 65% ASRE			

Endnotes

[1] Any parameter not specified in this exhibit shall be identical to the value entered for the Rated Unit. Where envelope building components do not exist in the Rated Unit, such as a foundation or slab, they should not be modeled in the DOE Efficient New Homes Multifamily Reference Design, unless explicitly stated, such as vented attics where unvented attics are present in the Rated Unit. Where the envelope component is adiabatic in the Rated Unit, it shall also be adiabatic in the Multifamily Reference Design. Where the envelope component is not adiabatic but is adjacent to a space other than those specified in the Building Component column of Exhibit 1, model as uninsulated in the Reference Design.

[2] "Same as Rated Unit" indicates that the parameter shall be identical to the value entered for the Rated Unit.

[3] Slab insulation R-values represent nominal insulation levels; and assembly U-factors for foundations, floors, walls, and ceilings represent the overall assembly, inclusive of sheathing materials, cavity insulation, installation quality, framing, and interior finishes.

[4] If software allows the user to specify the thermal boundary location independent of the conditioned space boundary in the basement of the Rated Unit, then the thermal boundary of the DOE Efficient New Homes Multifamily Reference Design shall be aligned with this boundary. For example, if the thermal boundary is located at the walls, then the wall insulation shall be configured as if it was a conditioned basement. If the thermal boundary is located at the floor above the basement, then the floor insulation shall be configured as if it was a floor over an unconditioned space.

[5] 2021 IECC Climate Zone designations, as defined and illustrated in Section R301 of the code, shall be used to configure the DOE Efficient New Homes Reference Design. Note that some locations have shifted to a different Climate Zone in the 2021 IECC compared to prior editions.

[6] Note that, for the purposes of the DOE Efficient New Homes Reference Design, the slab insulation R-value and depth shall be modeled even in jurisdictions designated by a code official as having Very Heavy Termite Infestation for the purpose of determining the DOE Efficient New Homes ERI Target.

[7] Note that the U-factor requirement applies to the whole door while the SHGC only applies to the glazed portion.

DOE Efficient New Homes has adopted the following definitions for door types (from the ENERGY STAR eligibility criteria in the Version 6.0 Product Specification for Residential Windows, Doors, and Skylights):

Door or Sidelite Type	Glazing Area (per NFRC 100)	Notes
Opaque	None	
≤ ½-Lite Door	≤ 900 in^2 (6.25 ft^2, 0.581 m^2)	Includes ¼- and ½-lite Doors and Sidelites
≤ ½-Lite Sidelite	≤ 281 in^2 (1.95 ft^2, 0.181m^2)	
> ½-Lite Door	> 900 in^2 (6.25 ft^2, 0.581 m^2)	Includes ¾-lite and fully glazed Doors and Sidelites.
> ½-Lite Sidelite	> 281 in^2 (1.95 ft^2, 0.181m^2)	

[8] When determining the DOE Efficient New Homes ERI Target, the following formula shall be used to determine total window area of the Multifamily Reference Design: AG = 0.15 x CFA x FA x F

Where:

- AG = Total glazing area
- CFA = Total conditioned area
- FA = (Gross above-ground thermal boundary wall area) / (Gross above-grade boundary wall area + 0.5 x Gross below-grade thermal boundary wall area)
- F = 1 – 0.44 (Gross common wall area) / (Gross above-grade thermal boundary wall area + Gross common wall area)

And where:

- Thermal boundary wall is any wall that separates conditioned space from unconditioned space, outdoor environment, or the surrounding soil;
- Above-grade thermal boundary wall is any portion of a thermal boundary wall not in contact with soil;
- Below-grade boundary wall is any portion of a thermal boundary wall in soil contact; and
- Common wall is the total wall area of walls adjacent to other conditioned space, not including foundation walls.

[9] A vented unconditioned attic shall only be modeled in the Multifamily Reference Design where attics (of any type) exist in the Rated Unit or when specified as the Duct Location in the Thermal Distribution systems section of this Exhibit. Where the Rated Unit has more than one ceiling type, the ceiling area used to calculate the vent aperture area shall be the area of the ceiling that is exposed to exterior, under attics, and/or under other unconditioned common spaces. Where the Rated Unit is entirely located beneath another dwelling unit or unrated conditioned space, no attic is modeled in the Reference Design.

[10] Fuel type(s) shall be same as Rated Unit, including any dual-fuel equipment where applicable. For a Rated Unit with multiple heating, cooling, or water heating systems using different fuel types, the applicable system capacities and fuel types shall be weighted in accordance with the loads distribution (as calculated by accepted engineering practice for that equipment and fuel type) of the multiple systems, unless otherwise specified by ANSI/RESNET/ICC Standard 301.

[11] The Target Home's duct leakage shall be configured as the maximum allowable total duct leakage to achieve Grade I, per Standard 310, section 5.4.1, Table 2a (shown below):

Time of Test	Number of Returns	Leakage Limit (CFM at 25 Pa)
Rough-In	< 3	The greater of ≤ 4 per 100 ft^2 of CFA or ≤ 40
Rough-In	≥ 3	The greater of ≤ 6 per 100 ft^2 of CFA or ≤ 60
Final	< 3	The greater of ≤ 8 per 100 ft^2 of CFA or ≤ 80
Final	≥ 3	The greater of ≤ 12 per 100 ft^2 of CFA or ≤ 120

[12] For a Rated Unit without a heating system, the DOE Efficient New Homes Multifamily Reference Design shall be configured with a 78% AFUE gas furnace system, unless the Rated Unit has no access to natural gas or fossil fuel delivery. In such cases, the Reference Design shall be configured with a 7.7 HSPF air-source heat pump.

Where a furnace or boiler is the heating system for the Rated Unit and is rated in thermal efficiency (Et), it shall be converted to AFUE using the following equation: AFUE = Et. Where rated in combustion efficiency (Ec), it shall be converted to AFUE using the following equation: AFUE = Ec - 2%.

[13] For a Rated Unit without a cooling system, the DOE Efficient New Homes Multifamily Reference Design shall be configured with a 13 SEER electric air conditioner.