ENERGY STAR[®] Residential New Construction Programs

Historical Document

This document is provided for reference because it has been superseded by a more recent Version or Revision. Please find current program documents on the <u>Program</u> <u>Requirements</u> webpage.

Use of older Versions and Revisions, such as this document, are typically limited to homes and buildings with a permit date (or, for manufactured homes, a production date) prior to a specified date. Consult the <u>Implementation Timeline</u> table to assess whether a home or apartment is still eligible to be certified using this document.

For questions or more information, contact us at <u>energystarhome@energystar.gov</u>.



National ERI Target Procedure for use with ANSI/RESNET/ICC 301-2014

This document provides detailed instructions for determining the ENERGY STAR ERI Target, the highest ERI value that each rated multifamily unit, excluding townhouses, may achieve to earn the ENERGY STAR. Note that, in addition to meeting the ENERGY STAR ERI Target for each unit, units shall also meet all Mandatory Requirements for All Multifamily New Construction Projects in Exhibit 2 of the National Program Requirements for ENERGY STAR Multifamily New Construction, Version 1 / 1.1 / OR-WA 1.2. While Townhouses are eligible to earn ENERGY STAR Multifamily New Construction certification by meeting their ENERGY STAR ERI Target and also meeting all Mandatory Requirements for All Multifamily New Constructions for determining their ENERGY STAR ERI Target is in the National ERI Target Procedure for ENERGY STAR Single-Family New Homes.

An EPA-recognized Home Certification Organization's (HCO) Approved Software Rating Tool shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Multifamily Reference Design) this target for each Rated Unit. This shall be done by configuring the ENERGY STAR Multifamily Reference Design in accordance with Exhibit 1, the Expanded ENERGY STAR Multifamily Reference Design Definition, and calculating its associated ERI value. The ERI value shall be calculated using ANSI / RESNET / ICC Standard 301-2014 including all Addenda and Normative Appendices, with new versions and Addenda implemented according to the implementation schedule defined by the HCO that the building is being certified under. Any exceptions shall be approved by EPA and reported at www.energystar.gov/ERIExceptions. This value, rounded to the nearest whole number, shall equal the ENERGY STAR ERI Target.

The National ERI Target Procedure (ANSI 301-2019) must instead be used to determine the ENERGY STAR ERI Target when using ANSI / RESNET / ICC Standard 301-2019.



National ERI Target Procedure (ANSI 301-2014) ENERGY STAR Multifamily New Construction, Version 1.1 (Rev. 02)

Exhibit 1: Expanded ENERGY STAR Multifamily Reference Design Definition

Building Component									
Foundations:	Construction Type & Structural Mass: Same as Rated Unit ² , except:								
	For masonry floor slabs, modeled with 80% of floor area covered by carpet and 20% of floor directly exposed to room air								
	Conditioning Type: Same as Rated Unit ² , except: • Crawlspaces shall be modeled as vented with net free vent aperture = 1sq. ft. per 150 sq. ft. of crawlspace floor area								
		ented with net fre	e vent ape	erture = 1sc	1. ft. per 150 s	sq. ft. of crawlspace	floor area		
	Gross Area: Same as Rated Unit ² Insulation: ^{3, 4} Choose appropriate insulati								
	Basement Wall Continuous Insulation	on level below; on R-Value only a	nnlies to c	onditioned	hasements.	if applicable_insulati	on shall he	located on i	interior
	side of walls	ni it-value only a	pplies to c	onultioneu	basements,	n applicable, insulati			Interior
	 Floor assemblies above crawlspace 	foundations shal	be config	ured to me	et the application	able floor assembly l	J-factor liste	ed in the bu	ilding
	component section for Floors Over I	Jnconditioned Sp	aces						-
	 Slab floors with a floor surface less 								
	downward from the top of the slab o								
	Climate Zone:	CZ 1 0	CZ 2 0	CZ 3 0	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
	Slab Insulation R-Value: Slab Insulation Depth (ft):	0	0	0	10 2	10 2	15 2	15 2	20 2
	Basement Wall	Ū.	-	-		_			
	Continuous Insulation R-Value:	0	0	0	7.5	7.5	7.5	10	12.5
Floors Over	Construction Type: Wood frame								
Unconditioned	Gross Area: Same as Rated Unit ²								
Spaces:	Insulation: ^{3, 4}								
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
	Floor Assembly U-Factor:	0.066	0.033	0.033	0.033	0.033	0.033	0.033	0.033
Above-Grade	Interior and Exterior Construction Type: V	lood frame							
Walls,	Gross Area: Same as Rated Unit ²								
adjacent to	Solar Absorptance = 0.75								
Exterior or	Emittance = 0.90								
Garage:	Insulation: 1,3								
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8
	Wall Assembly U-Factor:	0.064	0.064	0.064	0.064	0.064	0.051	0.051	0.036
	Wall Assembly 0-1 actor.	0.004	0.004	0.064	0.004	0.004	0.001	0.001	0.000
Thermally Isolated Suprooms:	None	0.004	0.004	0.004	0.004	0.004	0.001	0.001	0.000
Isolated Sunrooms:	None	0.004	0.004	0.004	0.004	0.004	0.001	0.001	
Isolated Sunrooms:	None Area: Same as Rated Unit ²	0.004	0.004	0.004	0.004	0.004	0.001	0.001	
Isolated Sunrooms:	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type:	Opaque			/2-Lite	> 1/2-Lite CZ		> 1/2-Lite (
Isolated Sunrooms:	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type: U-Factor:	Opaque 0.17		≤ 1/ (/2-Lite).25	> 1/2-Lite CZ 0.30		> 1/2-Lite (0.30	CZ 4-8
Isolated Sunrooms: Doors: ⁵	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type: U-Factor: SHGC:	Ораqие 0.17 n/а		≤ 1, ((/2-Lite	> 1/2-Lite CZ		> 1/2-Lite (CZ 4-8
Isolated Sunrooms: Doors: ⁵	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type: U-Factor: SHGC: Total Area: AG = 0.15 x CFA x FA x F, wi	Opaque 0.17 n/a thout exceeding a		≤ 1, ((/2-Lite).25	> 1/2-Lite CZ 0.30		> 1/2-Lite (0.30	CZ 4-8
Isolated Sunrooms: Doors: ⁵	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type: U-Factor: SHGC: Total Area: AG = 0.15 x CFA x FA x F, wi Orientation: Same as Rated Unit ² , by per	Opaque 0.17 n/a thout exceeding a centage of area	e available w	≤ 1, (((vall area ⁶	/2-Lite).25).25	> 1/2-Lite CZ 0.30 0.25	1-3	> 1/2-Lite (0.30	CZ 4-8
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Isolated Sunrooms: Doors: ⁵ Glazing: ⁵ Glazing: ⁵ Glazing: ⁵ Ceilings, adjacent to Exterior or Unconditioned Space Volumes:	None Area: Same as Rated Unit ² Orientation: Same as Rated Unit ² Door Type: U-Factor: SHGC: Total Area: AG = 0.15 x CFA x FA x F, wi Orientation: Same as Rated Unit ² , by per Interior Shade Coefficient: Same as Energy External Shading: None Climate Zone: U-Factor: SHGC: Class AW Assembly U-Factors (i.e., Struct Climate Zone: Fixed Window U-Factor: Operable Window U-Factor: Operable Window U-Factor: SHGC: None Construction Type: Wood frame Gross Area: Same as Rated Unit ² Insulation: ^{1,3} Climate Zone: Ceiling Assembly U-Factor:	Opaque 0.17 n/a thout exceeding a centage of area gy Rating Referen CZ 1 0.40 0.25 ctural) Windows b CZ 1 0.48 0.62 0.25	available w nce Home CZ 2 0.40 0.25 ased on 2 CZ 2 0.48 0.62 0.25 CZ 2 0.027	≤ 1, () () () () () () () () () () () () ()	/2-Lite 25 25 d by ANSI / R CZ 4 0.30 0.40 CZ 4 0.36 0.43 0.40 CZ 4 0.43 0.40 CZ 4 0.27	> 1/2-Lite CZ 0.30 0.25 ESNET / ICC Std. 3 CZ 4 C & 5 0.27 0.40 CZ 4 C & 5 0.36 0.43 0.40	1-3 01 CZ 6 0.27 0.40 CZ 6 0.34 0.41 0.40	> 1/2-Lite (0.30 0.40 CZ 7 0.27 0.40 CZ 7 0.28 0.35 0.40	CZ 4-8 CZ 8 0.27 0.40 CZ 8 0.28 0.35 0.40
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National ERI Target Procedure (ANSI 301-2014)

ENERGY STAR Multifamily New Construction, Version 1.1 (Rev. 02)

Exhibit 1: Expanded ENERGY STAR Multifamily Reference Design Definition (Continued)

Internal Mass:	Same as Energy Rating Reference Home, as defined by ANSI / RESNET / ICC Std. 301									
	Additional mass specifically designed as a Thermal Storage Element for the Rated Unit shall be excluded									
Lighting,	Lighting: Fraction of qualifying Tier I fixtures to all fixtures in qualifying light fixture locations 90% for interior; 0% for exterior and garage									
Appliances, Fixtures &	Refrigerator: 423 kWh per year									
Internal	Dishwasher: 0.66 EF, Place Setting Capacity Same as Rated Unit ² ; use 12 settings if no dishwasher installed in Rated Unit									
Gains:	Ceiling Fan: 122 CFM per Watt; Quantity = Number of bedrooms + 1 when ceiling fans present in the Rated Unit; otherwise Quantity = 0									
	Clothes Washer and Dryer: Same as Er	ergy Rating I	Reference H	ome, as defin	ed by ANSI /	RESNET / ICC	Std. 301			
	Water fixtures: all showers and faucets :	≤ 2.0 gpm								
	Internal Gains: Same as Energy Rating	Reference Ho	ome, as defi	ned by ANSI	RESNET / I	CC Std. 301, ex	cept for adjus	tments for t	he lightin	
	refrigerator, dishwasher, clothes washer								•	
Heating	Heating capacity shall be selected in ac	cordance with	n ACCA Mar	ual S based	on loads calc	ulated for the R	eference Desi	gn in accore	dance wit	
Systems:	ACCA Manual J, Eighth Edition, ASHRA	E Handbook	of Fundame	entals, or an e	quivalent cor	nputation proce	dure. For force	ed-air HVA0	C systems	
	degraded capacity from Grade III install									
	Fuel Type: Same as Rated Unit ^{2, 8}									
	Installation Quality: For forced-air HVAC	systems, Gr	ade III airflov	w and watt dra	aw; for air-so	urce heat pump	s, also Grade	III ref. char	ge	
	System Type: Same as Rated Unit ² , ex									
	modeled with air-source or ground-source									
	with ground-source heat pump in CZ 7 &									
	electric baseboard heat; applicable effic	iency selecte	d from below	v ⁹						
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4C & 5	CZ 6	CZ 7	CZ 8	
	Gas Furn. AFUE:	80	80	80	95	95	95	95	95	
	Oil Furn. AFUE:	80	80	80	85	85	85	85	85	
	Gas Boiler AFUE:	80	80	80	90	90	90	90	90	
	Oil Boiler AFUE:	80	80	80	86	86	86	86	86	
	Air-Source Heat Pump HSPF:	8.2	8.2	8.2	8.5	9.25	9.5	n/a	n/a	
			Electric	Ele etcie	Electric	Electric	Electric	n/a	n/a	
	Air-Source Heat Pump Backup:	Electric	LIECTIC	Electric	LIECTIC	LIECTIC	LIECTIC	11/0		
	Air-Source Heat Pump Backup: Ground-Source Heat Pump COP:	Electric n/a	n/a	n/a	n/a	n/a	n/a	3.6	3.6	
		n/a	n/a	n/a	n/a	n/a	n/a	3.6		
Cooling	Ground-Source Heat Pump COP: For non-electric warm furnaces and non for the Energy Rating Reference Home Cooling capacity shall be selected in acc	n/a -electric boile in ANSI / RES cordance with	n/a ers, the Elect SNET / ICC ACCA Man	n/a ric Auxiliary E Std. 301 Jual S based o	n/a nergy shall b on loads calc	n/a be determined in ulated for the R	n/a accordance v eference Desi	3.6 with the met	thodology dance wit	
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Cooling Systems:	Ground-Source Heat Pump COP: For non-electric warm furnaces and non for the Energy Rating Reference Home Cooling capacity shall be selected in act ACCA Manual J, Eighth Edition, ASHRA degraded capacity from Grade III install Fuel Type: Same as Rated Unit ^{2, 8} Installation Quality: For forced-air HVAC System Type: Same as Rated Unit ² , ex	n/a -electric boile in ANSI / RES cordance with AE Handbook shall be acco systems, Gr cept Reference	n/a ers, the Elect SNET / ICC ACCA Man of Fundame bunted for us ade III airflov ce Design sh	n/a ric Auxiliary E Std. 301 ual S based o entals, or an e ing same me w and watt dra nall be configu	n/a nergy shall b on loads calci quivalent cor thodology app aw; for AC's a ured with air-s	n/a ne determined ir ulated for the R nputation proce blied to Energy a air-source hea source heat pun	n/a accordance of eference Desi dure. For force Rating Refere at pumps, also np in CZ 1-6 w	3.6 with the mer gn in accord ed-air HVA0 nce Home o Grade III ro vhere Rated	thodology dance wit C system ef. charge I Unit is	
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National ERI Target Procedure (ANSI 301-2014) ENERGY STAR Multifamily New Construction, Version 1.1 (Rev. 02)

Exhibit 1: Expanded ENERGY STAR Multifamily Reference Design Definition (Continued)

Thermostat:	Type: Programmable									
	Temperature Setpoints: Same as E RESNET / ICC Std. 301	Energy Rating F	Reference Ho	me, but with o	offsets for a p	programmable th	nermostat, as	s defined by A	NSI /	
Infiltration &	Compartmentalization Rates:									
Mechanical Ventilation:	Floor Type:	100%	Conditioned	Space Belo	w	All Other				
ventilation.	cfm50/ft ² Enclosure Area ¹³		0.25	5		0.30				
	Mechanical ventilation system with	out heat recove	ery							
	Rate: CFM = 0.01 * CFA + 7.5 * (N	lbr + 1), where	CFA = Condit	ioned Floor A	rea and Nbr	= Number of Be	edrooms; Rui	ntime: 24 Hou	ırs / Day	
	Fan Watts: Watts = CFM Rate / 2.8 CFM per Watt, where CFM Rate is determined above									
	Climate Zone:	CZ 1	CZ 2	CZ 3	CZ 4	CZ 4 C & 5	CZ 6	CZ 7	CZ 8	
	Ventilation Type:	Supply	Supply	Supply	Supply	Exhaust	Exhaust	Exhaust	Exhaust	



Footnotes:

- 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 ENERGY STAR 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.
- 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 ENERGY STAR 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. Note that the U-factor requirement applies to all fenestration while the SHGC only applies to the glazed portion.
- 6. When determining the ENERGY STAR ERI Target, the following formula shall be used to determine total window area of the ENERGY STAR Multifamily Reference Design:

$$AG = 0.15 \times CFA \times FA \times F$$

Where:

- AG = Total glazing area
- CFA = Total conditioned floor area
- FA = (Gross above-grade thermal boundary wall area) / (Gross above-grade boundary wall area + 0.5 x Gross below-grade thermal boundary wall area)
- F = 1- 0.44 x (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.
- 7. A vented unconditioned attic shall only be modeled in the Multifamily Reference Design where attics (of any type) exist in the Rated Unit. 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 conditioned common space, no attic is modeled in the Reference Design.
- 8. 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.
- 9. For a Rated Unit without a heating system, the ENERGY STAR 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 ENERGY STAR Reference Multifamily Design shall be configured with a 7.7 HSPF air-source heat pump.
- 10. For a Rated Unit without a cooling system, the ENERGY STAR Multifamily Reference Design shall be configured with a 13 SEER electric air conditioner.
- 11. That is to say, representative of standard-flow plumbing fixtures, reference clothes washer gallons per day, standard distribution system water use effectiveness, a hot water piping ratio of 1.0, no pipe insulation, and no drain water heater recovery.
- 12. To determine domestic hot water (DHW) EF requirements for additional tank sizes, use the following equation: Oil DHW EF ≥ 0.70 (0.002 x Tank Gallon Capacity).
- 13. In accordance with the RESNET Guidelines for Multifamily Energy Ratings, for a Rated Unit with conditioned space below, software shall either automatically apply a 15% reduction to the compartmentalization results of the Rated Unit or instruct the Rater to apply the reduction. If automatically applied, the software shall make that known, such that the Rater does not also apply the same reduction. The 15% reduction shall not be applied if the Rated Unit is located in a building where outdoor air for the Rated Unit is supplied to the corridor and is not directly ducted either into the Rated Unit or into the Rated Unit's HVAC system.